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WATER TUBE BOILERS ALL STEEL SECTIONAL



CATALOG No. 35

SPRINGFIELD BOILER CO.
SPRINGFIELD ILLINOIS USA

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WATER TUBE BOILERS

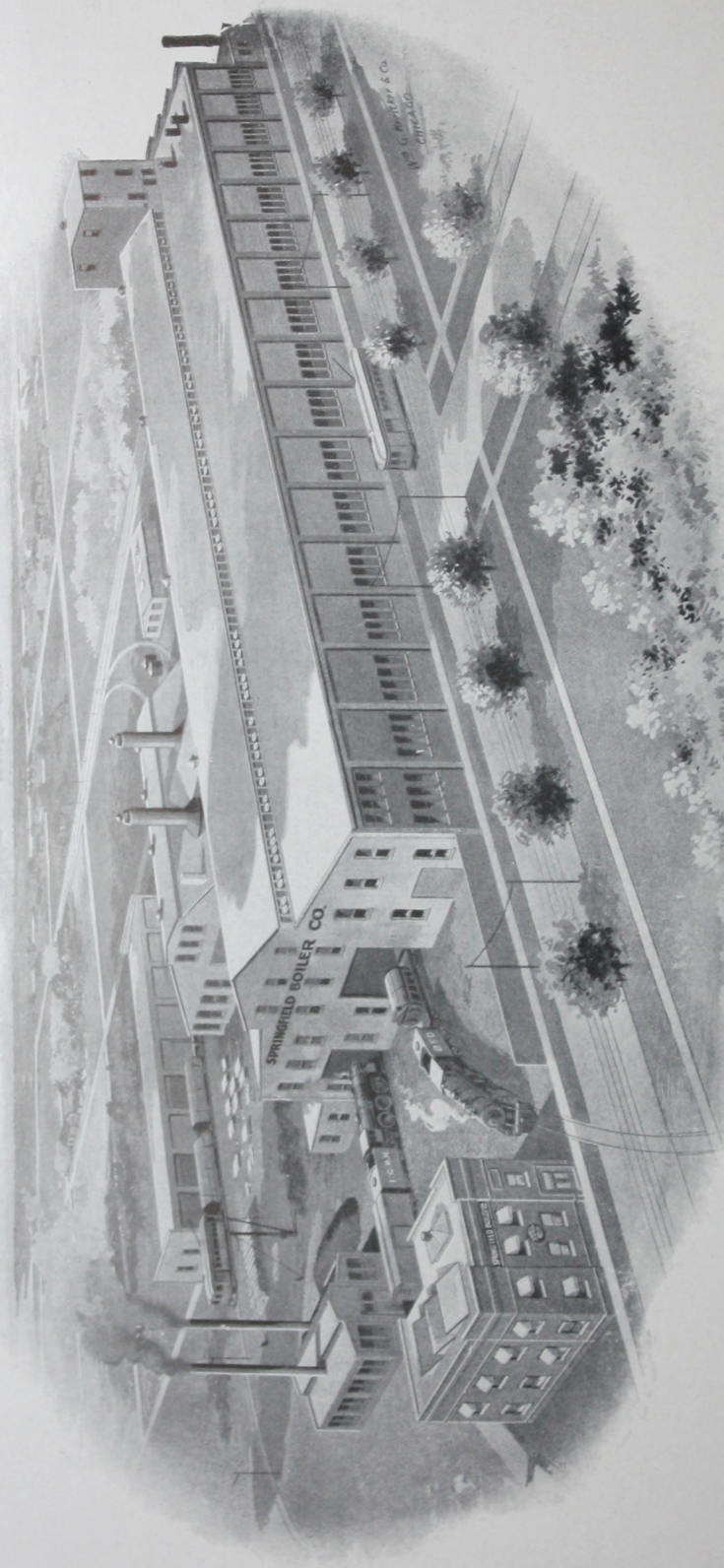
ALL STEEL SECTIONAL

• CATALOG NUMBER 35 •

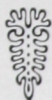
Established 1890



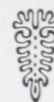
Built by
SPRINGFIELD BOILER CO.
SPRINGFIELD ILLINOIS U S A



MAIN PLANT OF THE SPRINGFIELD BOILER CO., SPRINGFIELD, ILLINOIS



Introductory



QUR experience in the manufacture of boilers, since 1890, covers a period of forty-five years. We believe that this experience, together with our modern equipment and engineering ability, entitles us to state that we are building steam generating equipment which is in both design and workmanship as perfect as may be.

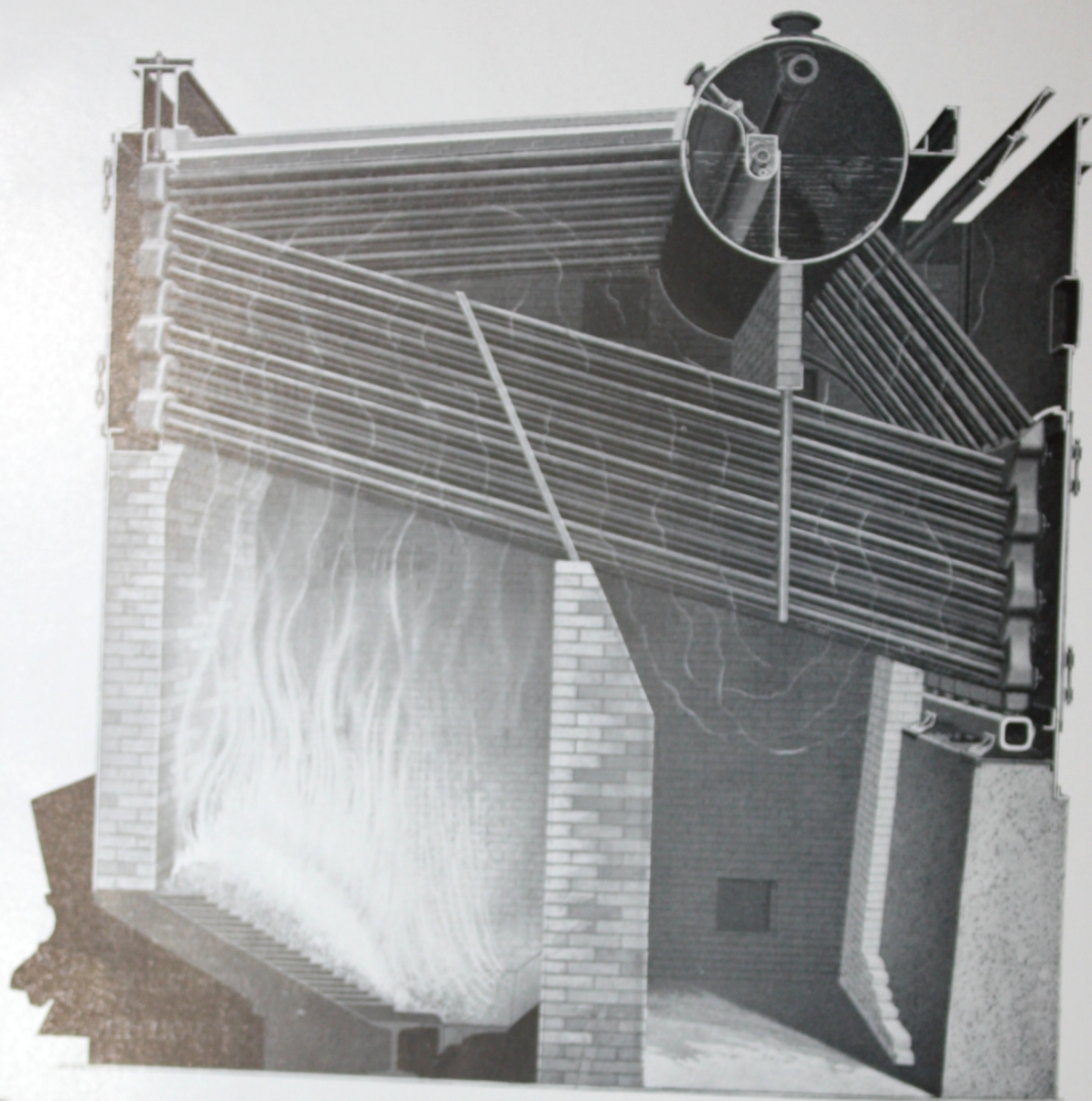
Great advances are being made in the art of steam generation. It is our purpose to continue our progressive policy in the design of SPRINGFIELD STEAM GENERATING UNITS, to continue to build accurately and skillfully, and to maintain for our clients an organization which will fully satisfy their demands.

We designed and built the first commercially successful WATER-COOLED FURNACE WALLS. We are pioneers in this most important improvement in steam generating equipment and solicit the opportunity of assisting you in solving your boiler plant problems.

We can furnish complete auxiliary power plant equipment, granting our clients the privilege of making their own selection of such auxiliaries.

Proper design and extreme care in construction have given SPRINGFIELD BOILERS AND WATER WALLS a reputation for satisfactory performance and economical operation. They have met and surpassed the rigid requirements of the leading engineers of this age.





*I*n the SPRINGFIELD BOILER, of which the above cut is a sectional view, the front headers are individually suspended, the rear resting on roller bearings as shown. This construction allows the sections to move in any direction, counteracts expansion and contraction and relieves the boiler from all strain.

The tubes are rolled in the sections in our shop before shipment and tested to a pressure at least 50% more than the working

pressure for which the boiler is built. Minimum test pressure is 500 lbs.

The tubes are 3" diameter, inclined at an angle of 15°, which greatly aids circulation. With this diameter tube the water is divided into smaller bodies; and with our special tube grouping the gases are broken up into smaller streams, creating a most thorough heat transfer. Each section is connected to the steam drum by four tubes. This gives large relieving area and insures positive and perfect circulation.

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

SPRINGFIELD BOILERS

THE SPRINGFIELD BOILER is of Sectional Header, Horizontal, Cross Drum design. Of all steel construction. Occupies minimum space and is readily modified to meet existing space conditions. Well adapted to the use of all fuels and all methods of firing. Built in all sizes and for all working pressures.

Each handhole plate covers four tubes. This means two-thirds less handholes than in other standard designs.

The headers are made of special electric steel of high tensile strength and ductility and are cast and electrically annealed in our own foundry. *Corrosion and pitting of our headers is unknown under the most severe water conditions.*

The boiler is simple and rugged in construction, accessible and easily cleaned. It is lighter in weight and more compact than other designs, and effects *worthwhile savings in*

building steel, foundations, masonry work and space.

Due to the sectional feature, tube arrangement, and baffle construction, the boiler is extremely simple to handle in shipment and during erection. It is possible to pass all parts through small openings in the building and only a few connecting tubes need to be expanded during erection.

Many of the prominent Utility and Industrial plants of the United States and foreign countries are using our equipment with entire success. *The larger part of our business is in repeat orders.*

All boilers built to American Society of Mechanical Engineers Boiler Construction Code. A certificate of inspection from a reliable Boiler Insurance Company is furnished with each boiler.

We have a competent, experienced staff of Engineers at your service. Write us for detailed information and suggestions.

SPRINGFIELD WATER WALLS

SPRINGFIELD WATER WALLS are built with the same simplicity of design and ruggedness of construction as the SPRINGFIELD BOILERS. The headers are manufactured of the same material as the boiler headers, but are made in different designs to suit varying conditions.

The spacing of the water wall tubes and the diameter of these tubes vary with different conditions, depending on working pressure and furnace design. We make water walls with wide tube spacing or so closely spaced that the tubes actually touch. The handholes are of ample proportions and arranged so that there is direct access to each tube.

SPRINGFIELD WATER WALLS are built in sec-

tions or panels—wherever possible—assembled and tested in the shop and shipped as complete finished units. This simplifies erection and assures accurate work.

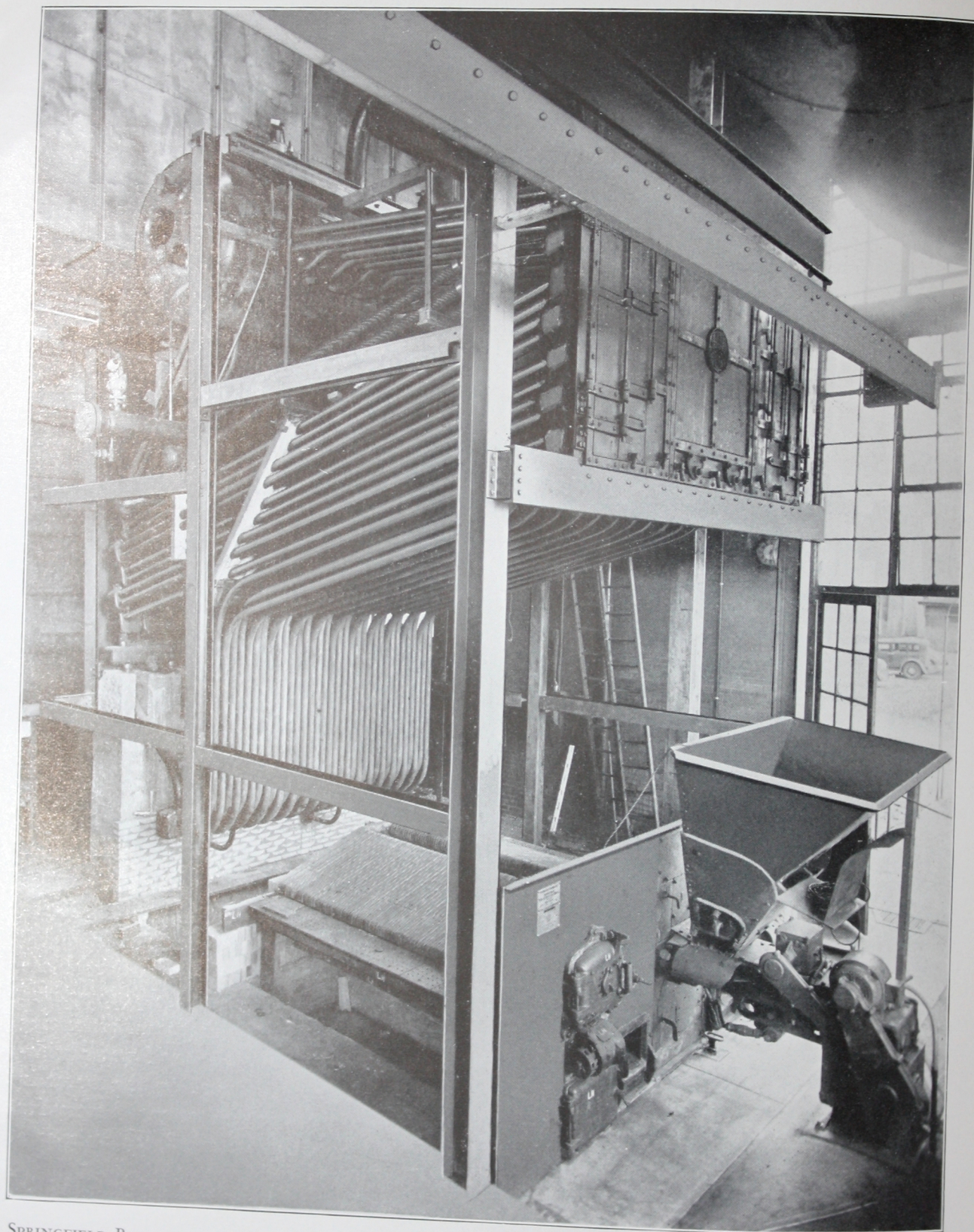
All feeder and riser connections from the boiler to the water walls are proportioned and designed to supply the steam generating surfaces with an abundance of water without interfering or disturbing the water in the boiler; these are important factors for satisfactory performance of the unit as a whole.

We build our Water Walls with bare tubes or with tubes partly or completely covered by protecting blocks, as illustrated on page 19. Our pioneer experience is at your service!

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



SPRINGFIELD BOILER WITH WATER-COOLED BRIDGE WALL INSTALLED FOR SOUTH PITTSBURGH WATER CO.
PITTSBURGH, PA.
AMERICAN CONSTRUCTION AND SECURITIES CO., ENGINEERS AND CONSTRUCTORS
They have installed SPRINGFIELD UNITS in Four of their plants

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



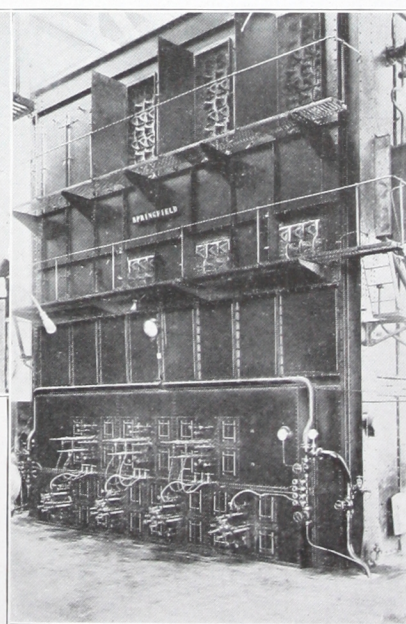
Dedication of Central Power Station of Mestre, Venice, Italy. Plant contains 1870 H.P. SPRINGFIELD BOILERS.
M. GONZALES DE ZENETE, ENGINEER



Central Power Station of Maurizio Capuano, Naples, Italy.

One of the two 1780 H.P. SPRINGFIELD
BOILERS installed in this plant.

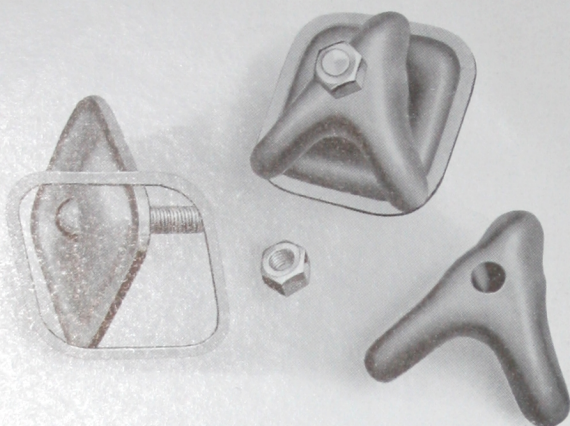
M. GONZALES DE ZENETE, ENGINEER



SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

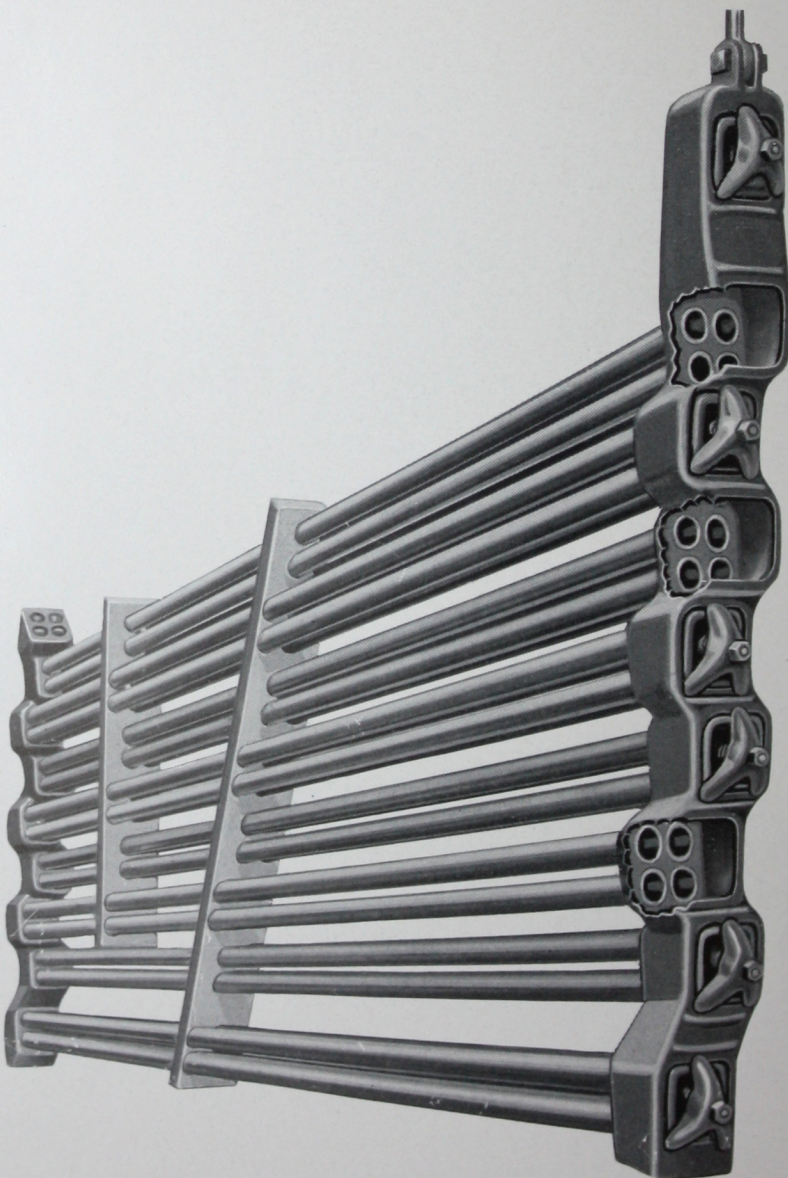


Four-Tube Handhole Plate

THIS cut shows the detail of the four-tube handhole plate, which is an inside cover. The inside of the header is machined to a smooth surface for the handhole plate. This makes a tight joint and there is no trouble from leakage.

THIS is a picture of a complete header section. Note the hanger bolt by which it is suspended, the one-piece baffles extending the full height of the header, the front baffle inclined, the rear baffle vertical. Several of the handholes are removed, each of which exposes four tubes.

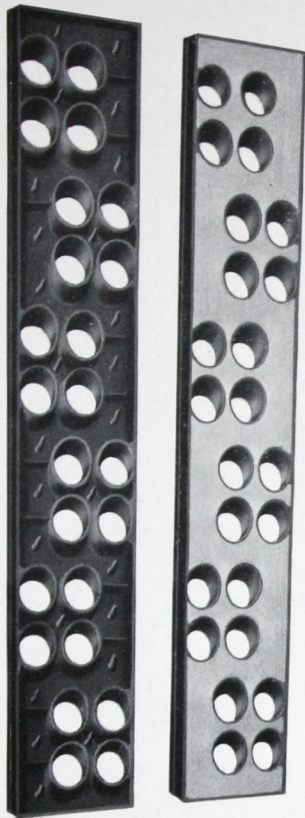
The headers are of all-steel construction; in fact, *every pressure part of the entire boiler is of steel.*



SPRINGFIELD BOILER CO.,

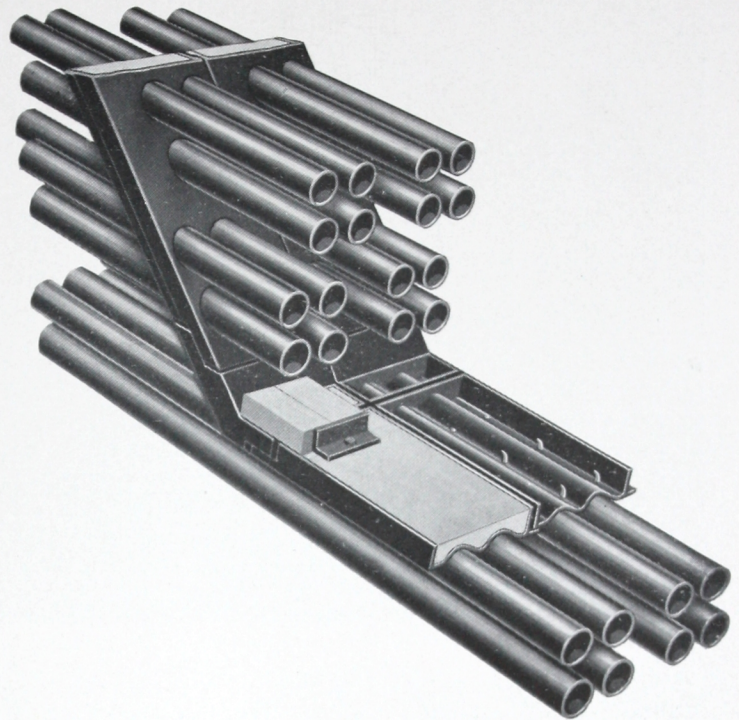


SPRINGFIELD, ILLINOIS, U. S. A.

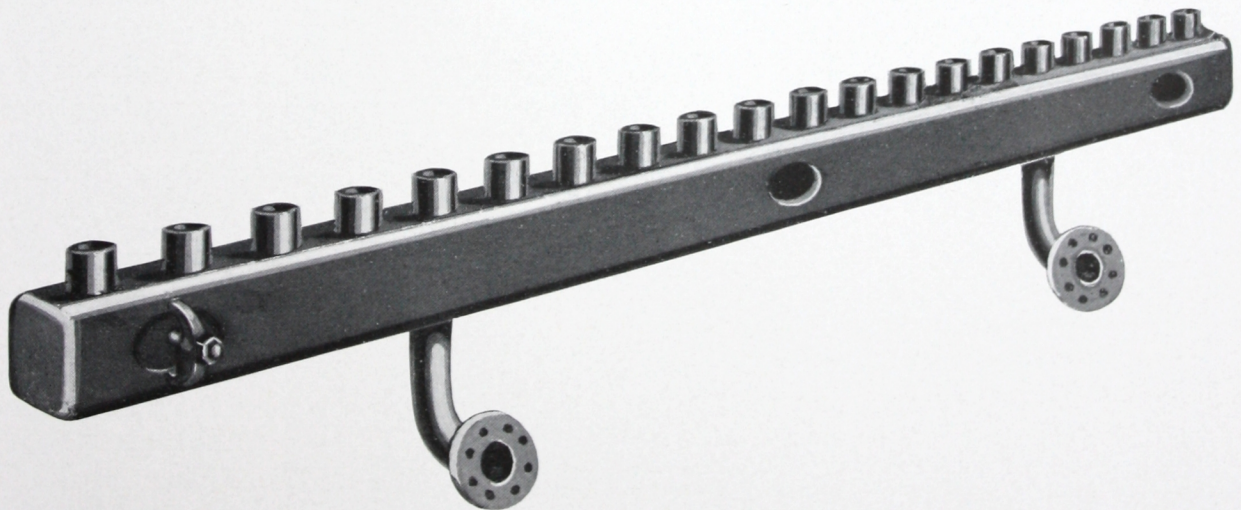


SPRINGFIELD baffles are of the filled type. The filling is of refractory material, supported by cast iron frame, and forms a solid wall. Any tube may be taken out without disturbing the baffles or any other parts of the boiler.

This baffle takes advantage of the *water-cooling effect* of the tubes and is *practically indestructible*.



ABOVE is shown a section of our horizontal baffle and how it is connected to the front baffle.



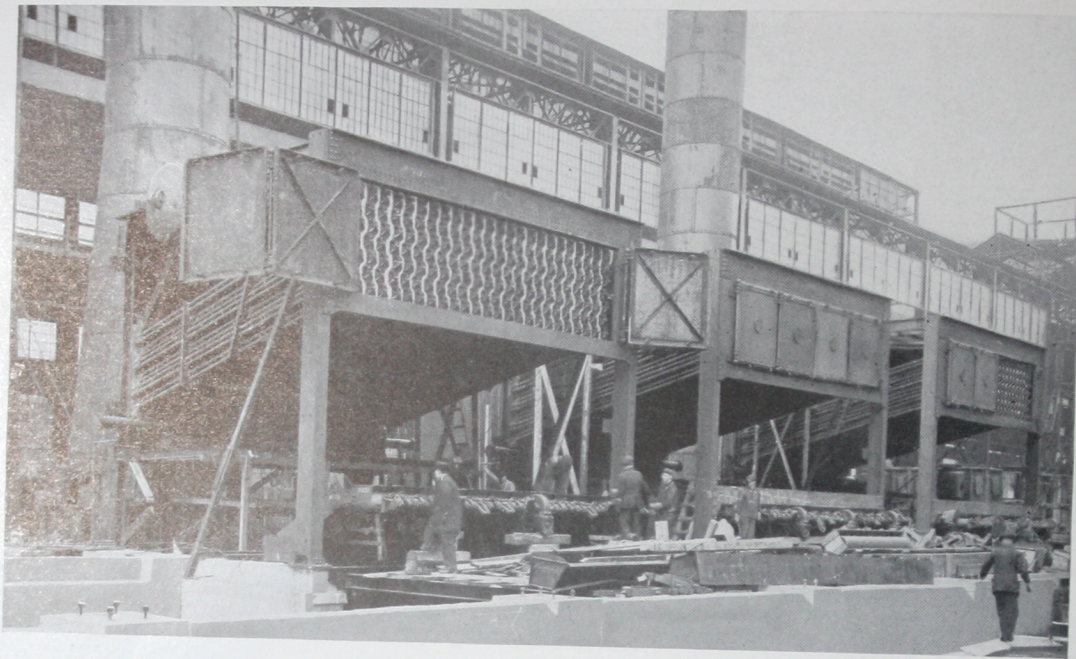
THE design of our Mud Drum is shown above. They are made of the same special electric steel as our boiler headers.

Each drum is provided with hand hole openings with plates of inside pattern to facilitate cleaning, also steel elbows to which blow-off valves are to be attached.

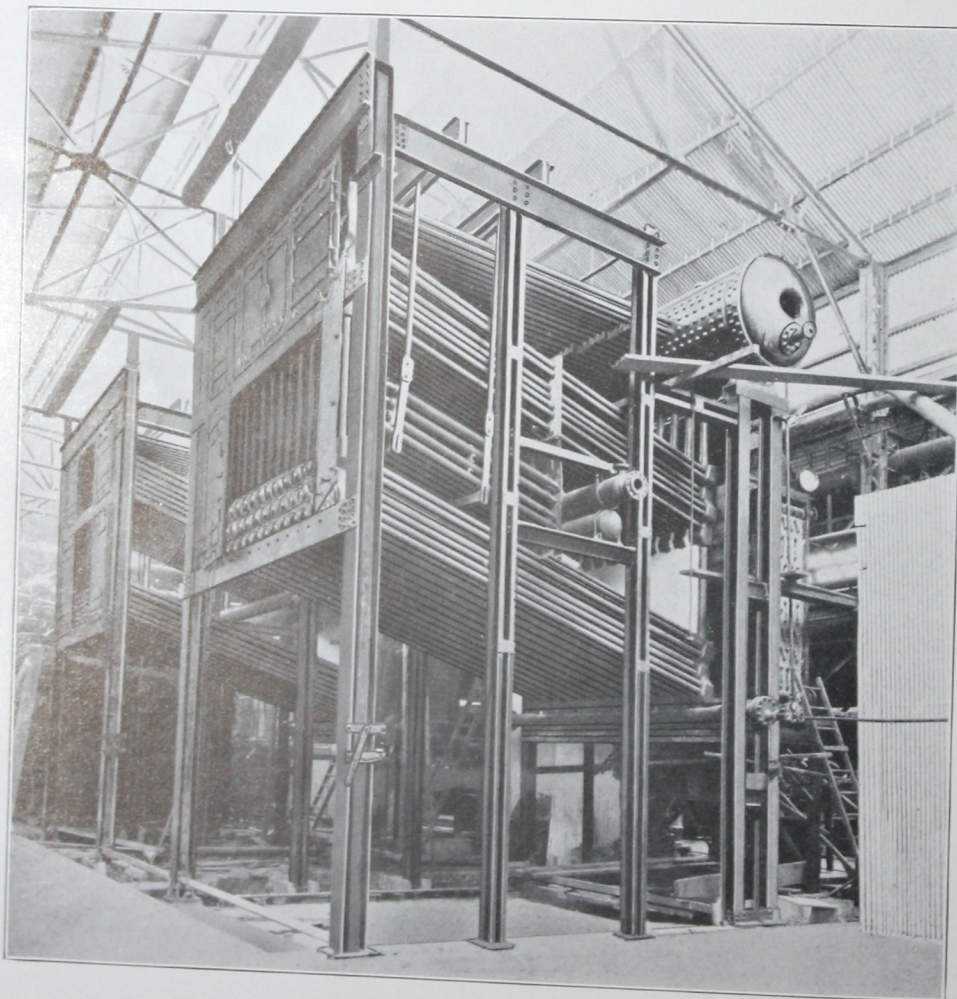
SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



*V*IEW of three 1076 H.P. SPRINGFIELD BOILERS, taken during erection at the plant of the Inland Steel Company, Indiana Harbor, Indiana. A later installation of three similar boilers was made in this plant.



*T*WO 562 H. P. SPRINGFIELD BOILERS, built for 400 lbs. working pressure, with inter-deck superheaters; during erection in the plant of Cananea Consolidated Copper Co., Cananea, Sonora, Mexico. Installed for Anaconda Copper Mining Co.

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

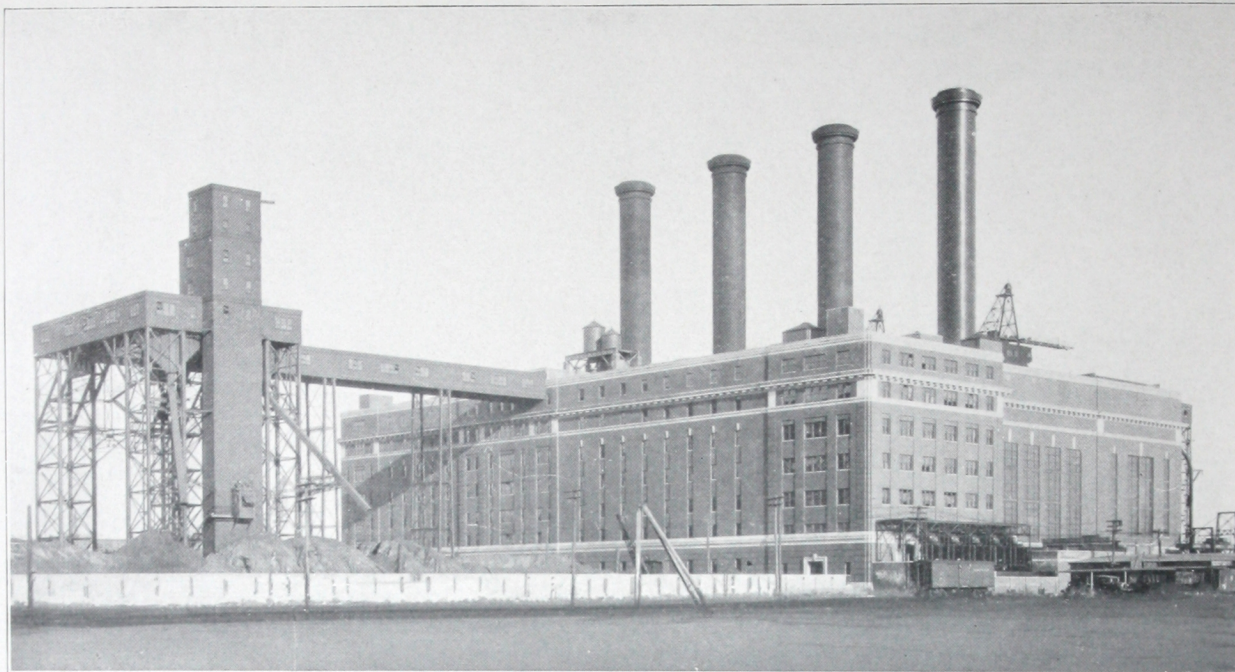


A few of the State buildings served by the State Capitol Power Plant at Springfield, Illinois, which contains 2,000 H. P. SPRINGFIELD BOILERS.

Other Illinois State Institutions operating with SPRINGFIELD BOILERS are—

- Ill. State Hospital, Kankakee, Ill.
- Ill. School for the Deaf, Jacksonville, Ill.
- Ill. State Normal University, Normal, Ill.
- East Moline State Hospital, East Moline, Ill.
- St. Charles School for Boys, St. Charles Ill.
- Manteno State Hospital, Manteno, Ill.
- Ill. State Penitentiary, Joliet, Ill.
- Ill. State Hospital, Jacksonville, Ill.

Many other public Institutions and Buildings throughout the United States are equipped with SPRINGFIELD STEAM GENERATING UNITS.



HELL GATE STATION—UNITED ELECTRIC LIGHT & POWER COMPANY, NEW YORK CITY

THOS. E. MURRAY, INC., CONSULTING ENGINEERS

This plant contains 40590 H.P. SPRINGFIELD BOILERS

Condensed Summary of test on 1550 H.P. SPRINGFIELD BOILERS

Boiler-Heating Surface, Including Area of Side Wall, Tubes and Fins Exposed to Furnace, Sq. Ft.	15,900
Superheater Surface, Sq. Ft.	7,430
Economizer Surface, Sq. Ft.	13,824
Grate Surface, Sq. Ft.	378
Furnace Volume, Cu. Ft.	8,000
DATE—TEST 3—Feb. 25-26, 1924	
DATE—TEST 5—Mar. 18-19, 1924	

HEAT BALANCE

TEST NUMBER.	3.	5.	Max. Rat.
Duration, Hours	25	28	3/4
Coal Fired Per Hour (as received), Lb.	7,633	8,133	
Actual Water Per Hour, Lb.	87,750	88,221	265,000
Equivalent Water Per Hour, Boiler and Superheater, Lb.	93,278	99,335	289,000
Equivalent Water Per Hour, Boiler and Superheater and Econ., Lb.	103,809	106,003	308,275
Quality of Saturated Steam, Per Cent	98.75	98.89	98.10
Pressure in Boiler Drum, Lb. Gage	267	266	280
Pressure in Superheater Outlet, Lb. Gage	263	263	244

TEMPERATURES (Degrees Fahr.)

Feed Water Entering Economizer	205	128.2	165
Feed Water Entering Boiler	285	233.1	267
Boiler Room	65	81	
Air for Combustion	58	65	
Flue Gases Leaving Boiler	455	485	660
Flue Gases Leaving Economizer	229	193	336
Superheated Steam	547	565.3	563

DRAFT (Inches of Water)

Drop Through Boiler and Superheater	0.45	0.50	3.27
Drop Through Economizer	0.21	0.27	2.00
Total Draft Loss	0.66	0.77	5.27
Forced-Draft Pressure in Wind Box	1.16	1.85	6.00
Rating Developed by Boiler and Superheater, Per Cent	170	181	528
Combined Efficiency, Boiler and Superheater	83.2	84.6	
Per Cent Economizer	89.6	92.7	

PROXIMATE COAL ANALYSIS

Moisture, Per Cent	2.55	3.80
Volatile Matter, Per Cent	20.00	18.81
Fixed Carbon, Per Cent	70.42	70.19
Ash, Per Cent	7.03	7.16
Fusion Temp., Deg. F.	2,440	2,450
B. T. U. Per Lb. as Fired	14,261	14,010

TEST NUMBER.

	3.	Per Cent.	5.	Per Cent.
Heat Per Pound of Dry Coal	14,626	100	14,563	100
Absorbed by Water and Steam in Boiler and Superheater	12,153.1	83.2	12,322.1	84.6
Absorbed by Water in Economizer	956.0	6.5	1,183.2	8.1
Loss Due to Moisture in Coal	29.7	0.2	43.7	0.3
Loss Due to Water from Combustion of Hydrogen	470.9	3.2	446.7	3.1
Loss Due to Moisture in Air	3.4	+0.0	2.5	+0.0
Loss Due to Dry Chimney Gases	739.2	5.1	469.4	3.2
Loss Due to Incomplete Combustion of Carbon	30.4	0.2	20.7	0.1
Loss Due to Unconsumed Combustible in Refuse	62.8	0.4	52.6	0.4
Loss Due to Unconsumed Hydrogen and Hydro-Carbons, Radiation and Unaccounted for	181.0	1.2	31.1	0.2
		100.0		100.0

FLUE GAS ANALYSIS

TEST NUMBER.	3.	5.	Max. Rat.
	Leaving Boiler	Leaving Boiler	Leaving Boiler
Carbon Dioxide, Per Cent	11.69	10.91	13.04
Oxygen	7.52	8.45	6.25
Carbon Monoxide, Per Cent	0.06	0.04	0.04
Pounds of Gas Per Lb. of Coal	17.55	18.78	15.83
Per Cent of Excess Air	60.1	71.6	38.4

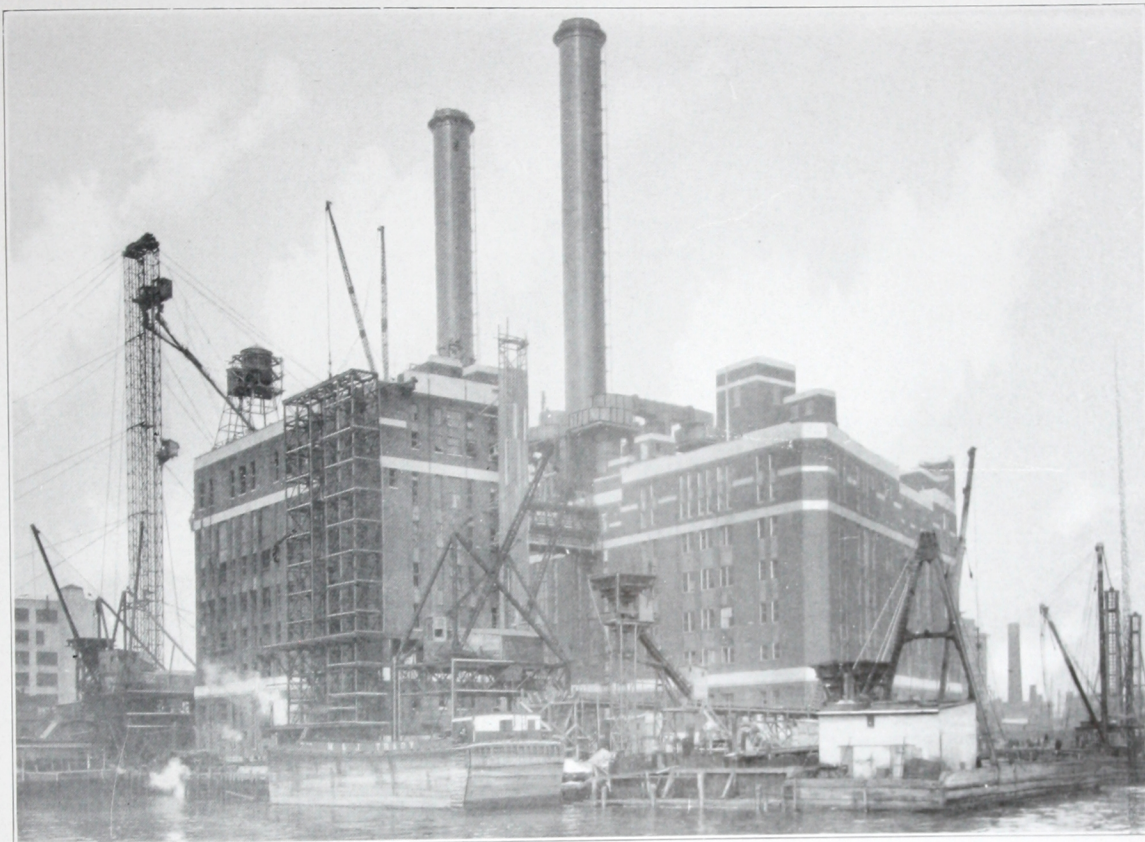
ASH ANALYSIS

Refuse, Per Cent of Coal Fired	7.46	7.80
Per Cent Combustible	4.50	4.44

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

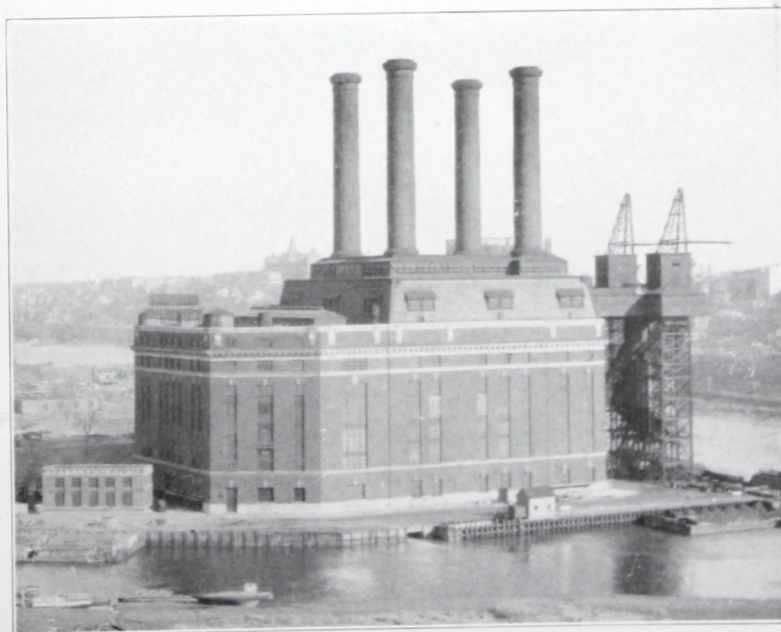


THE EAST RIVER STATION OF THE NEW YORK EDISON COMPANY OF NEW YORK CITY, here illustrated, contains 9300 H.P. SPRINGFIELD UNITS.

THOS. E. MURRAY, INC., CONSULTING ENGINEERS

THE SHERMAN CREEK STATION OF THE UNITED ELECTRIC LIGHT & POWER COMPANY, NEW YORK CITY, containing 3700 H.P. SPRINGFIELD BOILERS.

THOS. E. MURRAY, INC.,
CONSULTING ENGINEERS



SPRINGFIELD BOILER CO.,



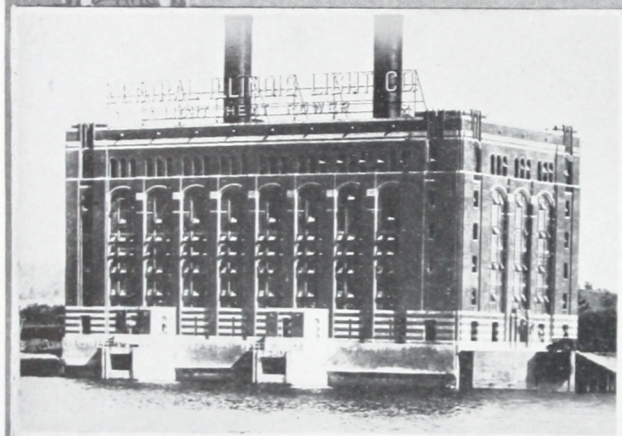
SPRINGFIELD, ILLINOIS, U. S. A.



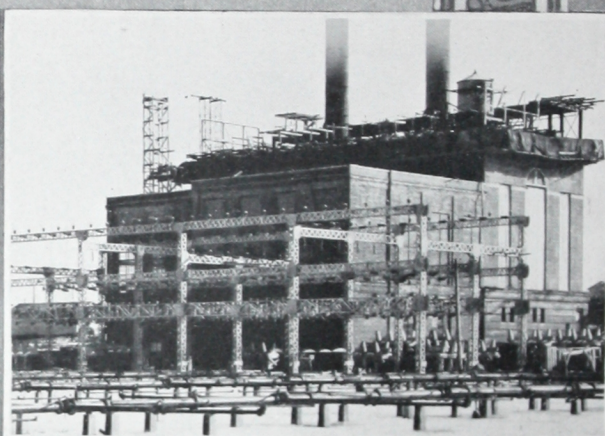
PEOPLES GAS & ELECTRIC CO.
MASON CITY, IOWA
UNITED LIGHT & POWER ENG. &
CONSTRUCTION CO., ENGINEERS



INTERSTATE POWER CO.
DUBUQUE, IOWA
MANAGEMENT & ENGINEERING CORP.
ENGINEERS



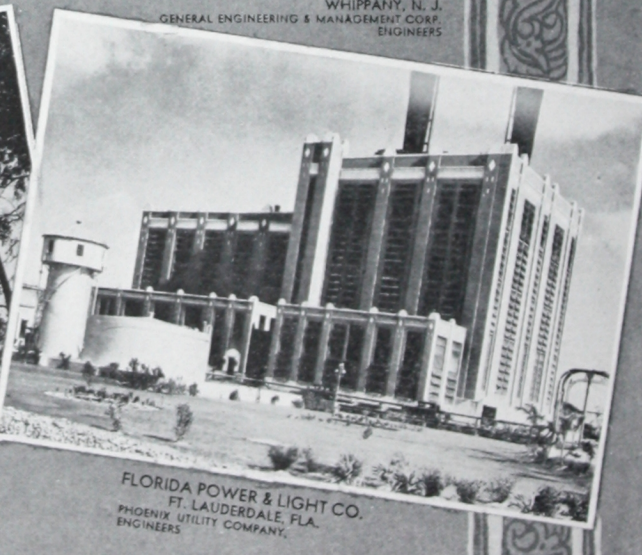
CENTRAL ILLINOIS LIGHT CO., Peoria, Ill.
COMMONWEALTH POWER CORPORATION
ENGINEERS



JERSEY CENTRAL POWER & LIGHT CO.
WHIPPANY, N. J.
GENERAL ENGINEERING & MANAGEMENT CORP.
ENGINEERS



OKLAHOMA GAS & ELECTRIC CO.
OKLAHOMA CITY, OKLA.
BYLESBY ENGINEERING & MANAGEMENT CORP.
ENGINEERS



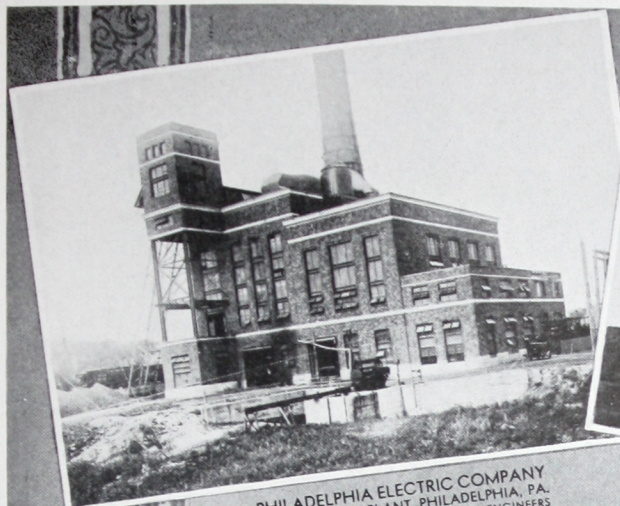
FLORIDA POWER & LIGHT CO.
FT. LAUDERDALE, FLA.
PHOENIX UTILITY COMPANY,
ENGINEERS

SOME OF THE PUBLIC UTILITY PLANTS EQUIPPED WITH SPRINGFIELD BOILERS

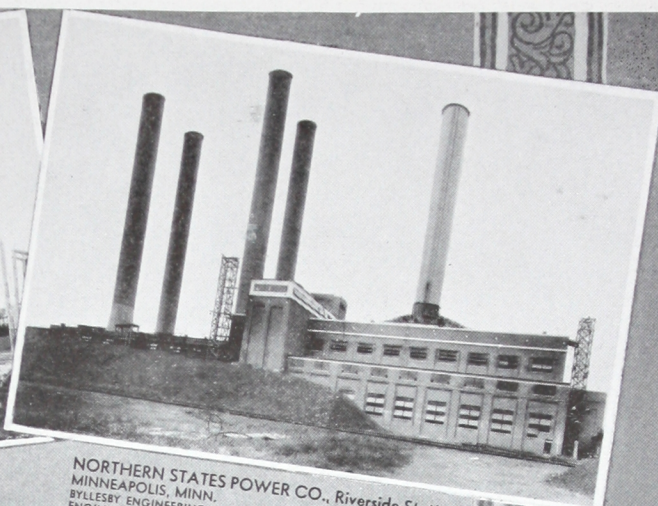
SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



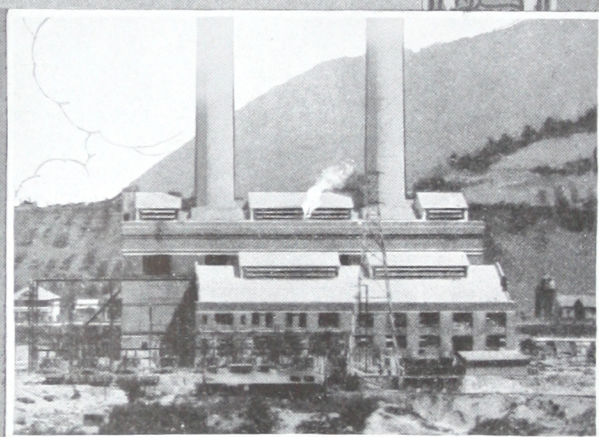
PHILADELPHIA ELECTRIC COMPANY
BARBADOES ISLAND PLANT, PHILADELPHIA, PA.
U. G. I. CONTRACTING CO., ENGINEERS



NORTHERN STATES POWER CO., Riverside Station
MINNEAPOLIS, MINN.
BYLLESBY ENGINEERING & MANAGEMENT CORP.
ENGINEERS



FLORIDA POWER & LIGHT CO.
SANFORD, FLORIDA
PHOENIX UTILITY CO., ENGINEERS



VIRGINIAN RAILWAY COMPANY
NARROWS, VA.
GIBBS & HILL, INC., ENGINEERS



CONNECTICUT LIGHT & POWER CO.
DEVON, CONN.
U. G. I. CONTRACTING CO., ENGINEERS



LOUISIANA POWER CO.
STERLINGTON, LA.
FORD, BACON & DAVIS, ENGINEERS

SOME ADDITIONAL PUBLIC UTILITY PLANTS IN WHICH SPRINGFIELD BOILERS ARE INSTALLED

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



BUNTE BROTHERS
CHICAGO, ILLINOIS
RICHARD E. SCHMIDT
GARDEN & MARTIN, ENGINEERS



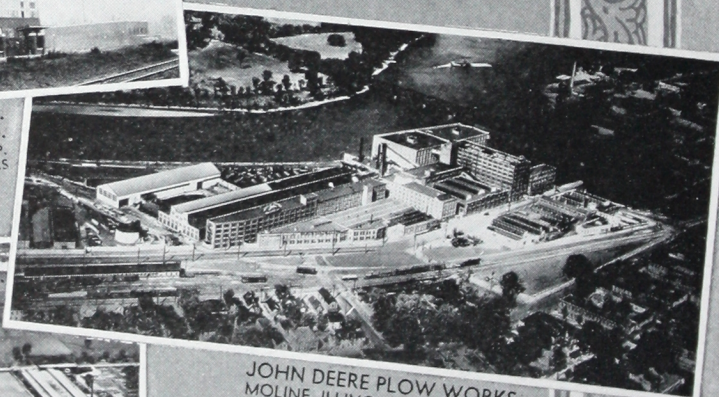
AMERICAN BEMBERG CORP.
BEMBERG, TENN.
LOCKWOOD, GREENE & CO.
ENGINEERS



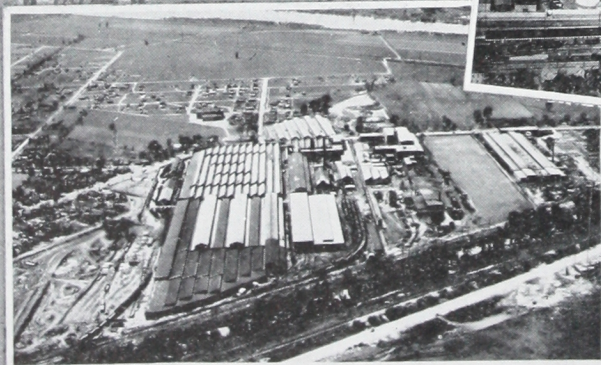
BUSH TERMINAL CO.
BROOKLYN, N. Y.
STEVENS & WOOD, INC.
ENGINEERS



ANHEUSER-BUSCH, INC.
YEAST PLANT No. 2, OLD BRIDGE, N. J.
STONE & WEBSTER ENGINEERING CORP.
ENGINEERS



JOHN DEERE PLOW WORKS
MOLINE, ILLINOIS
MR. E. WINHOLT, CHIEF ENGINEER



CATERPILLAR TRACTOR CO. PEORIA, ILL.
AUSTIN & COMPANY ENGINEERS

A FEW OF THE INDUSTRIAL PLANTS EQUIPPED WITH SPRINGFIELD BOILERS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



HOTEL SYRACUSE
SYRACUSE, N. Y.



SAKS & COMPANY, FIFTH AVENUE
NEW YORK CITY



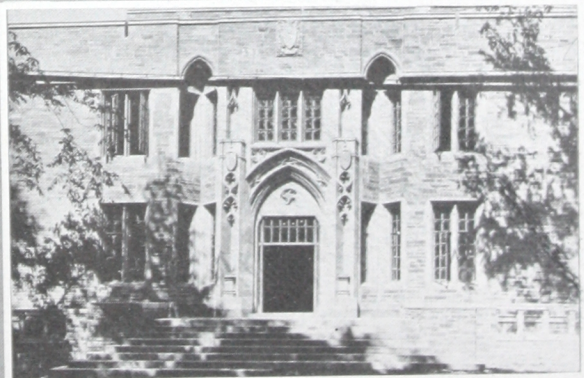
THE EQUITABLE LIFE ASSURANCE
SOCIETY BUILDING
NEW YORK CITY



SAINT NICHOLAS HOTEL
SPRINGFIELD, ILLINOIS



WESTERN RESERVE UNIVERSITY
CLEVELAND, OHIO



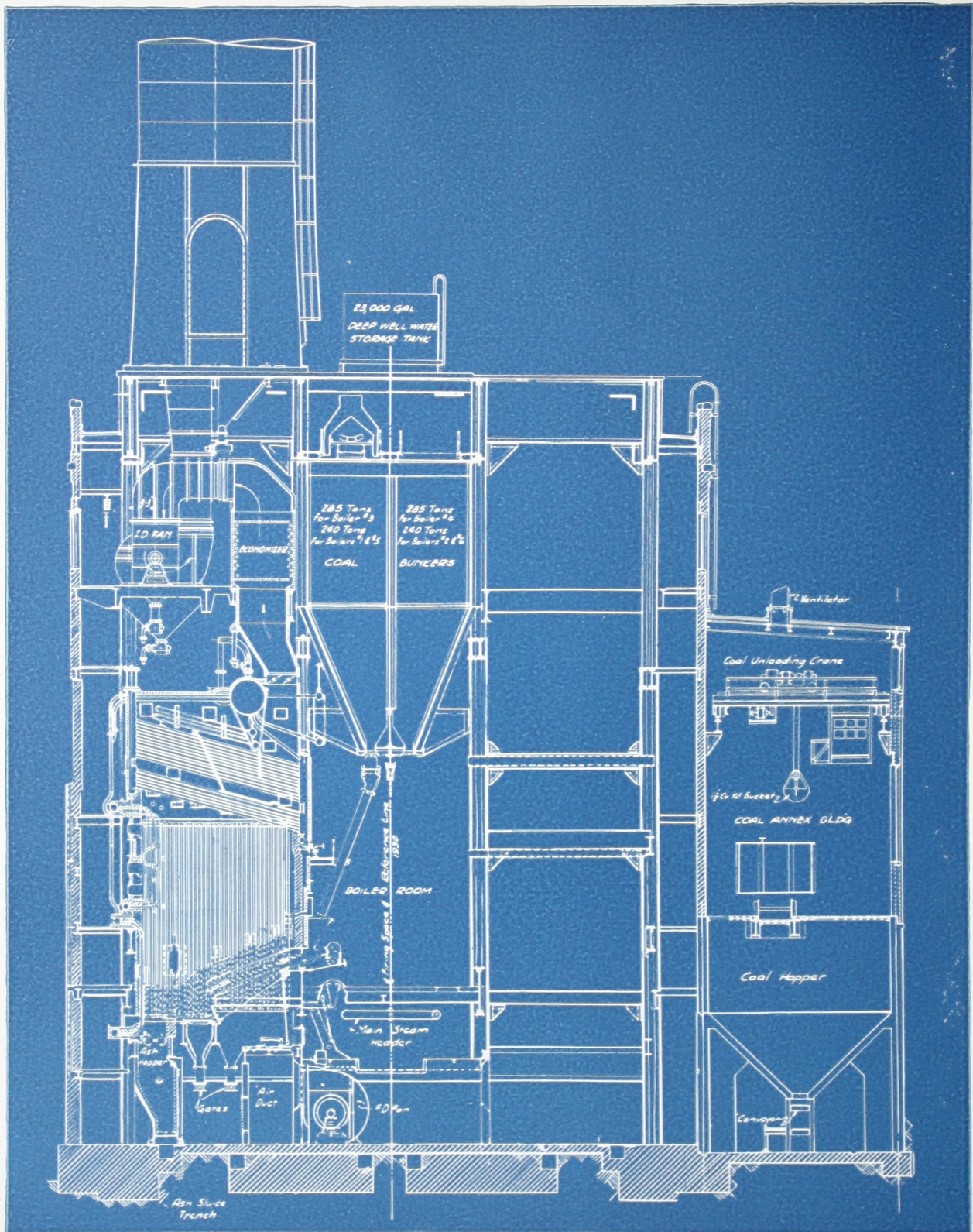
NEW ENGINEERING BUILDING
PRINCETON UNIVERSITY PRINCETON, N. J.

SOME OF THE PUBLIC BUILDINGS AND INSTITUTIONS IN WHICH SPRINGFIELD BOILERS
ARE INSTALLED

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



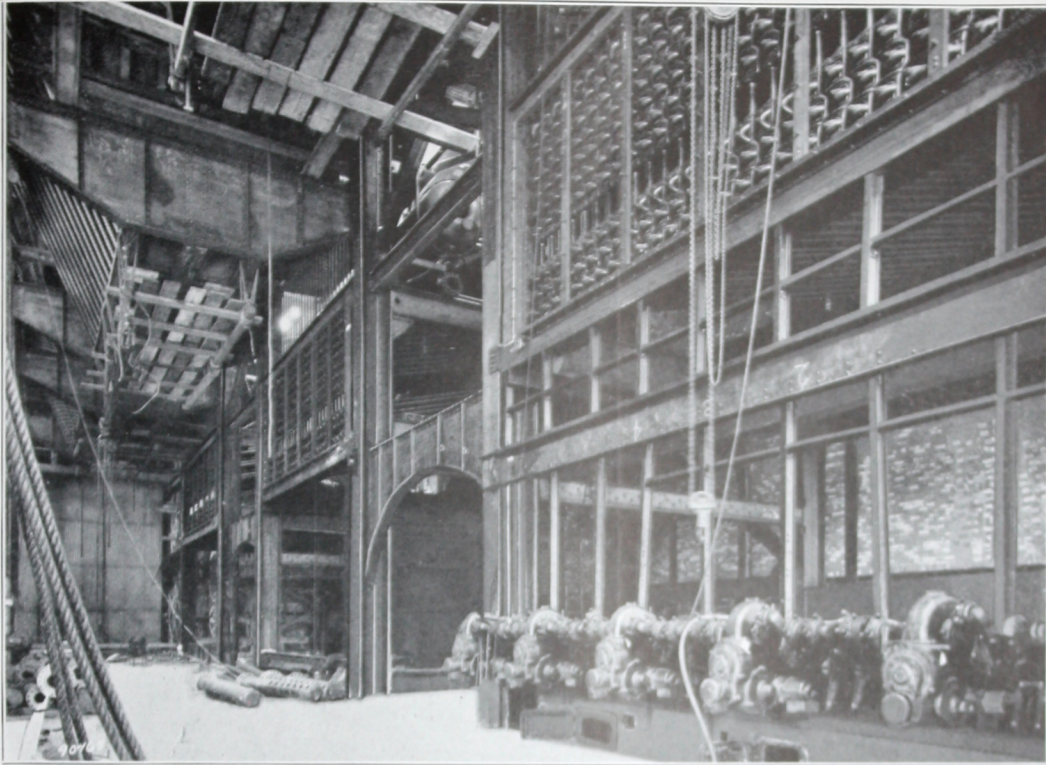
Section through boiler room Riverside Station, Northern States Power Co., Minneapolis, Minn.
 Three complete SPRINGFIELD UNITS consisting of SPRINGFIELD BOILERS AND SPRINGFIELD WATER WALLS
 each designed for 225,000 lbs. steam generation at 450 lbs. pressure

BYLLESBY ENGINEERING & MANAGEMENT CORP., ENGINEERS & CONSTRUCTORS

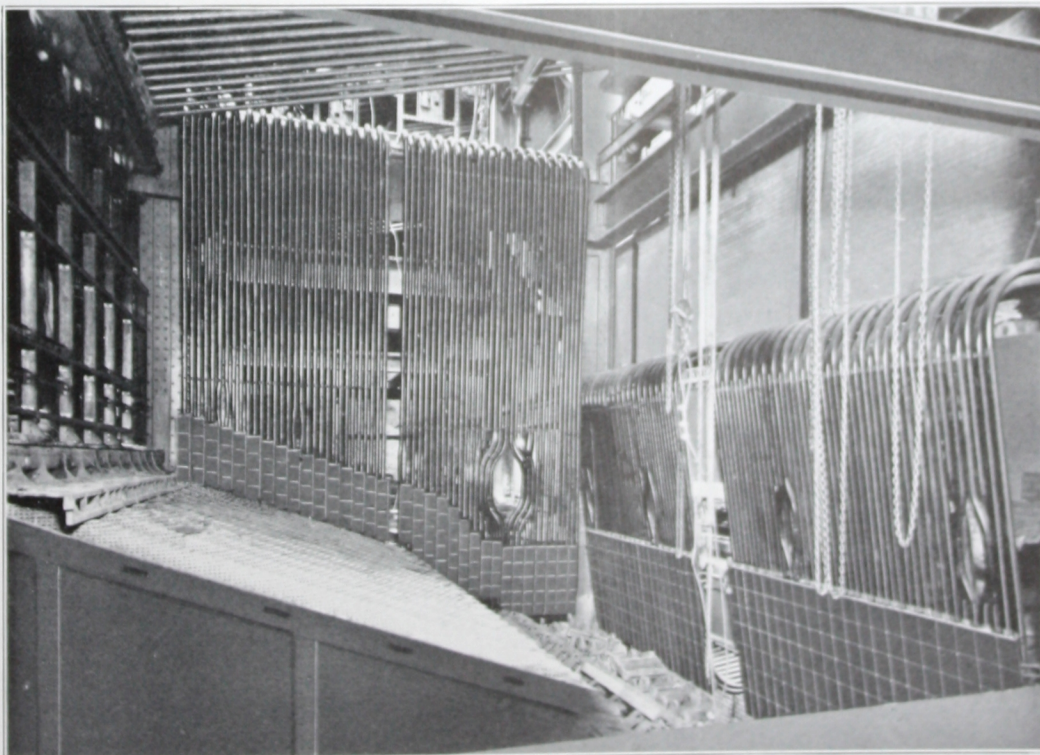
SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



Interior view of Northern States Power Co., plant, Minneapolis, Minn. This shows three 225,000 lb. steam generating SPRINGFIELD UNITS during erection
 BYLLESBY ENGINEERING & MANAGEMENT CORP., ENGINEERS & CONSTRUCTORS



This photograph shows SPRINGFIELD WATER WALLS being installed in one of the boilers in upper photograph. The Water Wall tubes are protected with METAL BLOCKS
 BYLLESBY ENGINEERING & MANAGEMENT CORP., ENGINEERS & CONSTRUCTORS

SPRINGFIELD BOILER CO.,



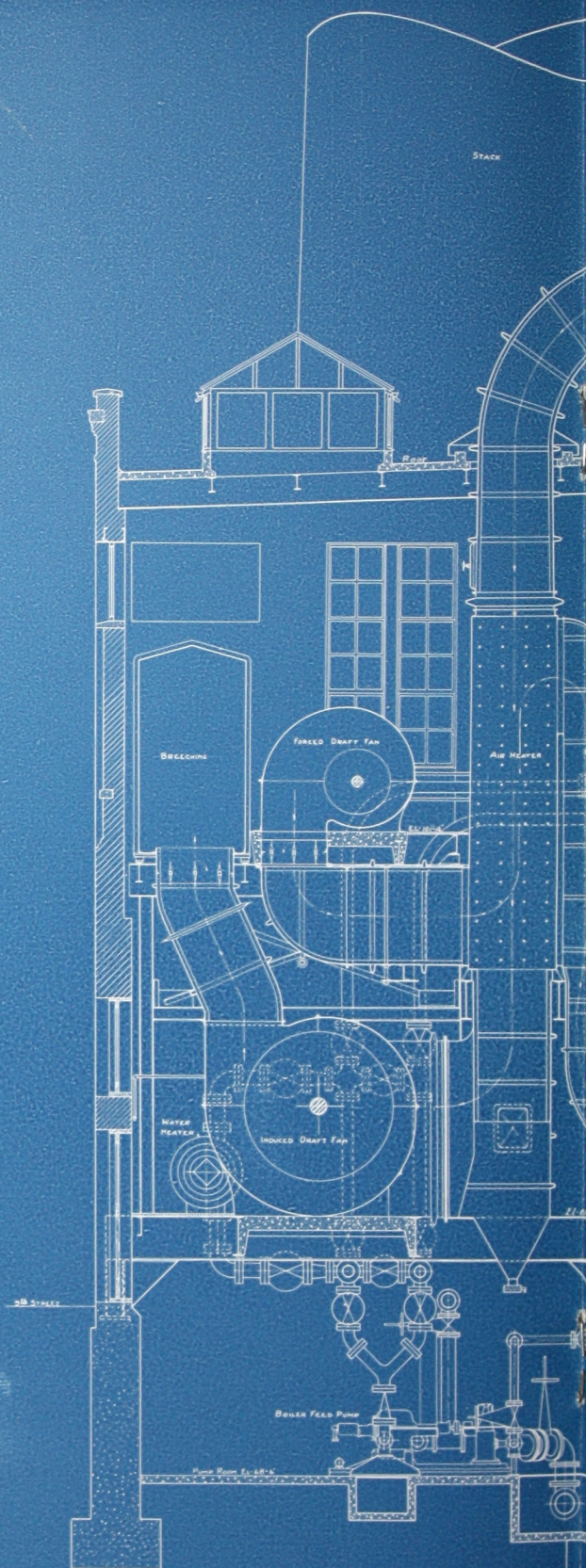
SPRINGFIELD, ILLINOIS, U. S. A.

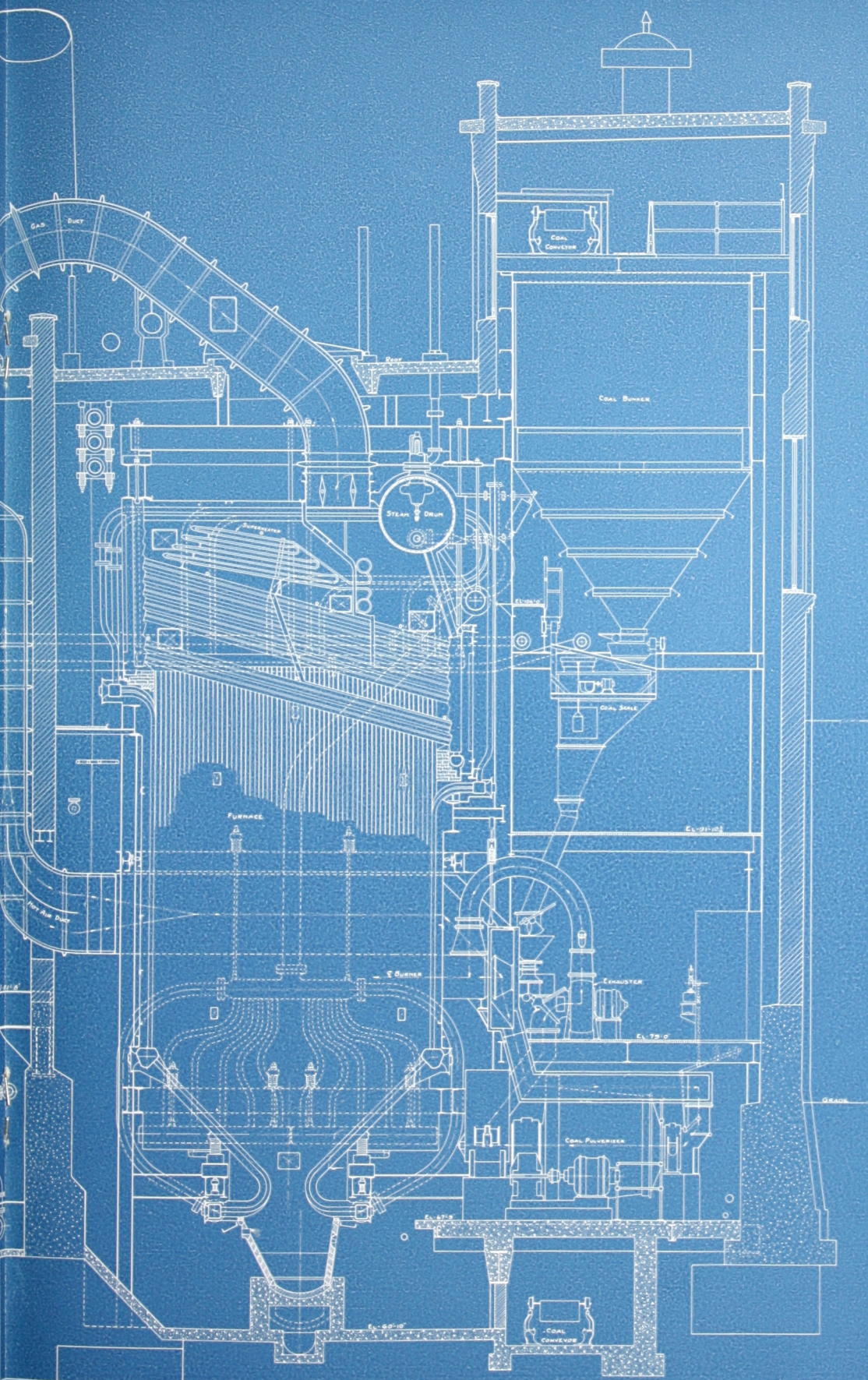
SECTION through boiler plant of Anheuser-Busch, Inc., St. Louis, Mo. This cut shows one of the FOUR 150,000 lbs. steam generating units designed to operate at 500 lbs. pressure.

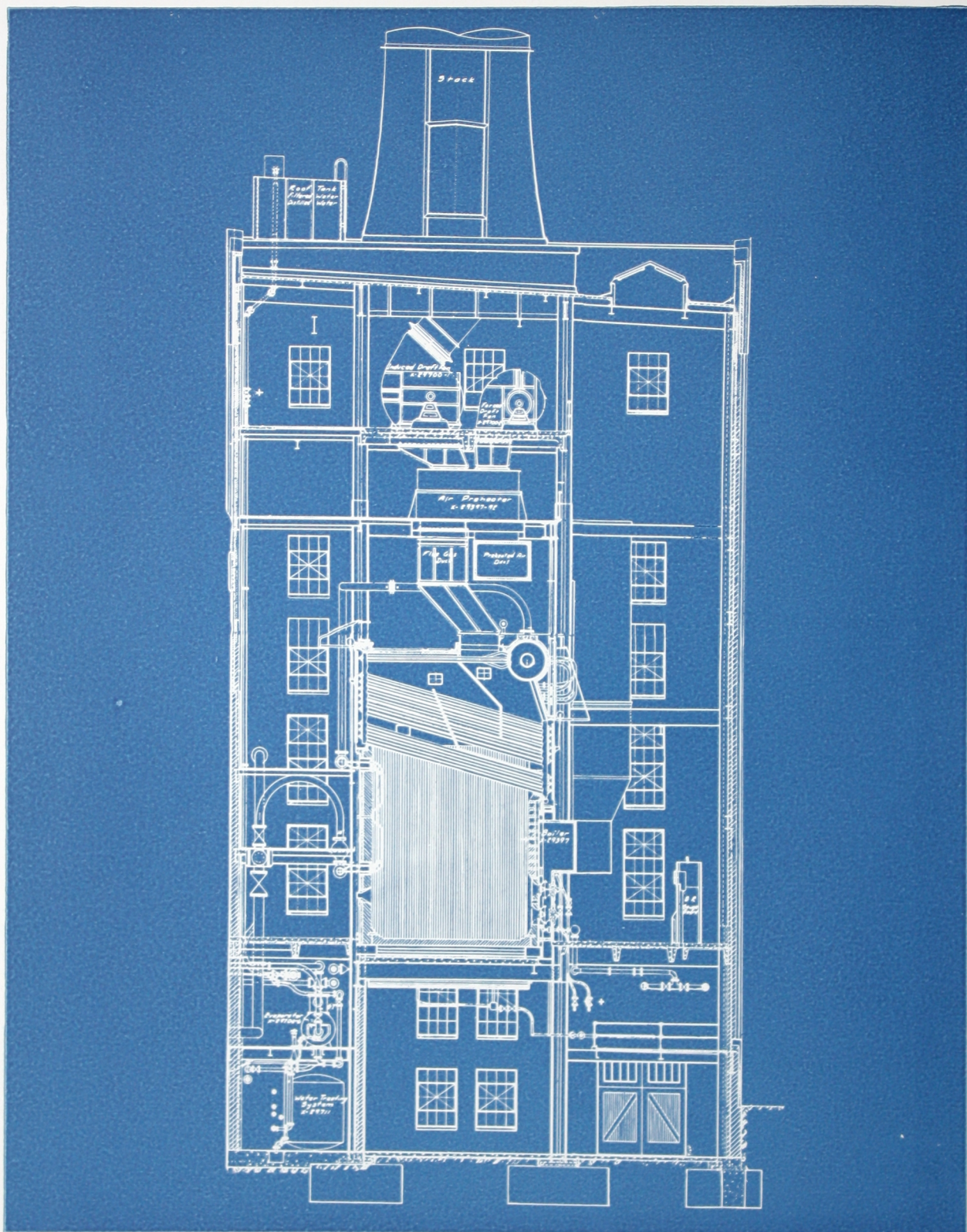
Installation consists of SPRINGFIELD BOILERS AND WATER WALLS. (This new plant replaced a number of isolated plants containing a total of twenty-five water tube boilers.)

OPHULS AND HILL, INC.,
ENGINEERS

Anheuser-Busch, Inc., had previous experience with SPRINGFIELD BOILERS before building this model up-to-date plant. They had installed them in a number of their subsidiary plants.







Section through boiler plant of the Arthur S. Huey Memorial Generating Station of Oklahoma Gas & Electric Co., Oklahoma City, Okla.
Three 180,000 lbs. SPRINGFIELD STEAM GENERATING UNITS, BOILERS AND WATER WALLS, designed to operate at 450 lbs. pressure.

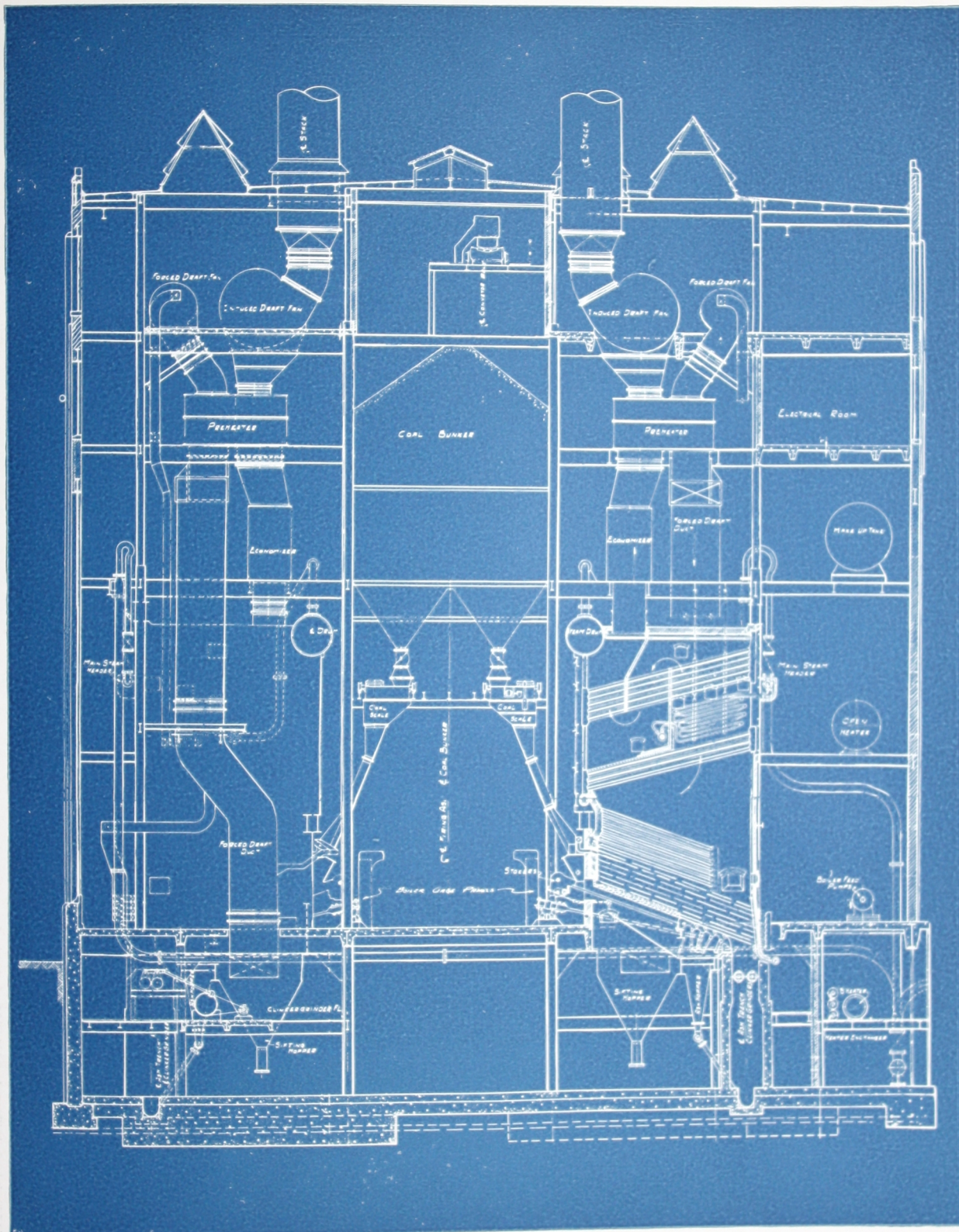
BYLESBY ENGINEERING & MANAGEMENT CORP., ENGINEERS & CONSTRUCTORS

Two similar SPRINGFIELD UNITS, BOILERS AND WATER WALLS, are installed in the LINCOLN BEERBOWER STATION of Oklahoma Gas & Electric Co., Ponca City, Okla.

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



Section through boiler plant of the Harding Street Station, Indianapolis Power & Light Co., Indianapolis, Ind.
EIGHT 1188 H.P. SPRINGFIELD UNITS BUILT FOR 450 LBS. PRESSURE

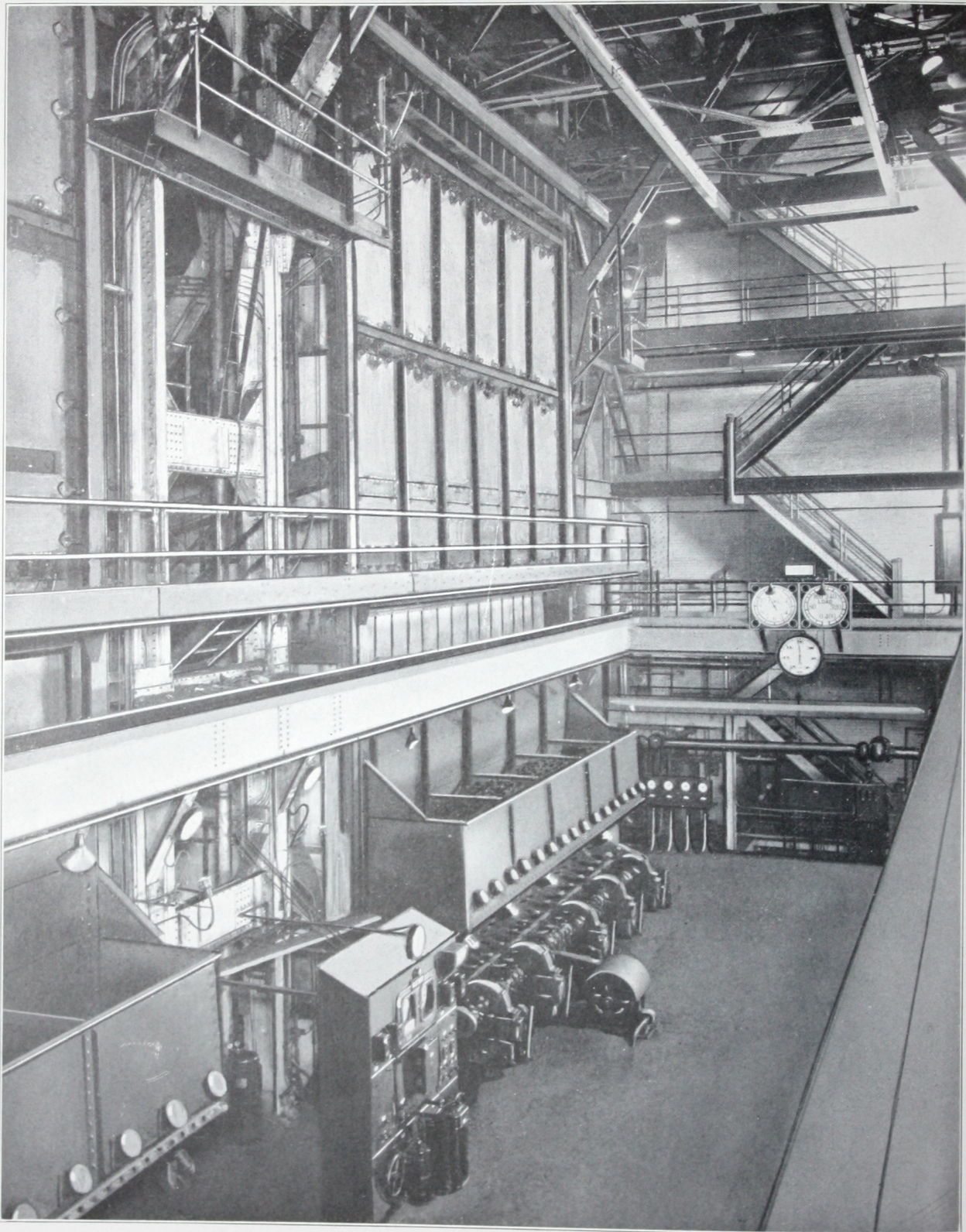
MANAGEMENT & ENGINEERING CORP., ENGINEERS & CONSTRUCTORS

This company has installed SPRINGFIELD BOILERS in SEVEN of their plants, totaling over 25,000 boiler horse power.

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

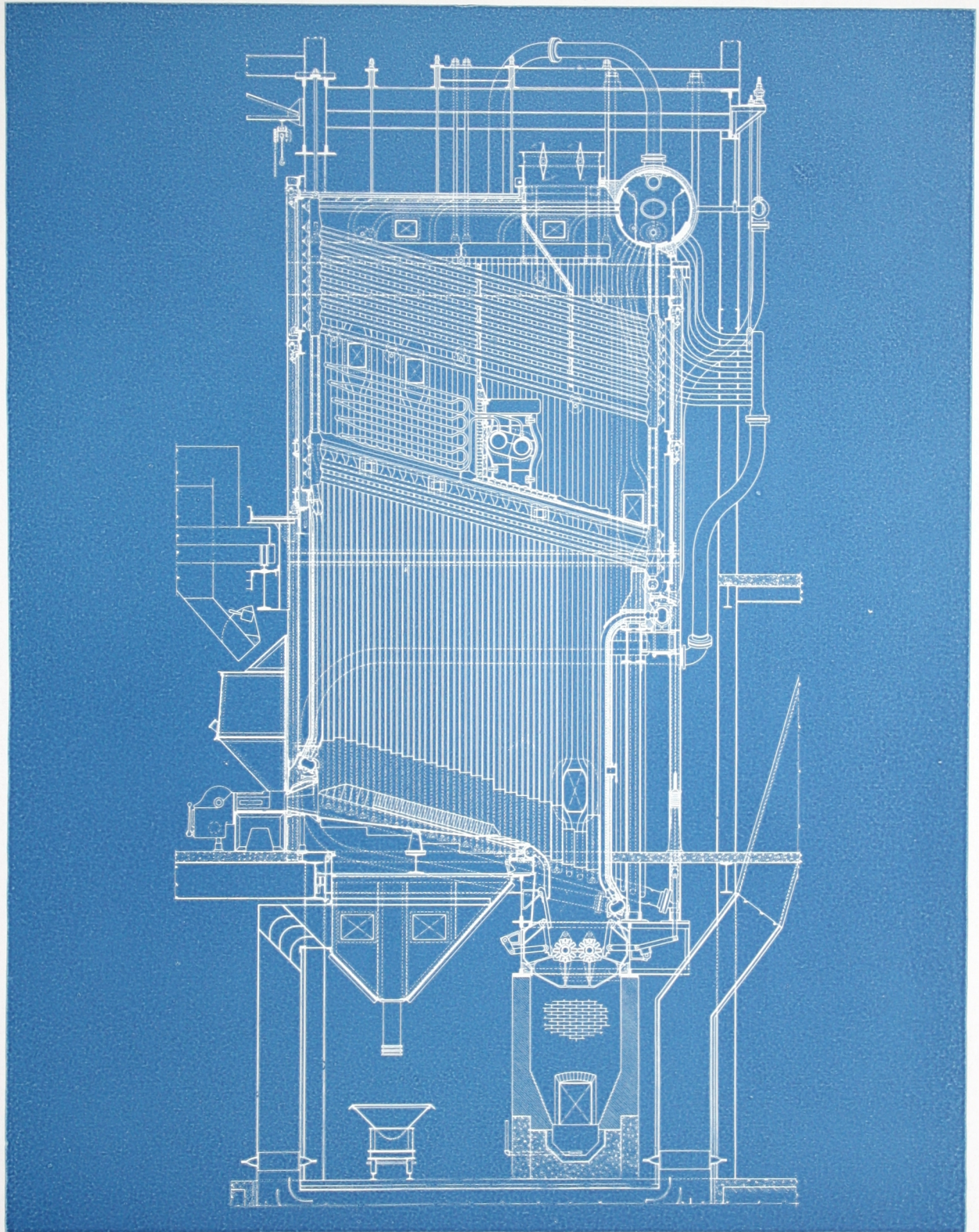


ONE OF THE THREE 2290 H.P. SPRINGFIELD BOILERS INSTALLED AT THE KEARNY STATION OF THE PUBLIC
SERVICE ELECTRIC & GAS COMPANY, KEARNY, NEW JERSEY
PUBLIC SERVICE PRODUCTION CO., ENGINEERS AND CONSTRUCTORS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

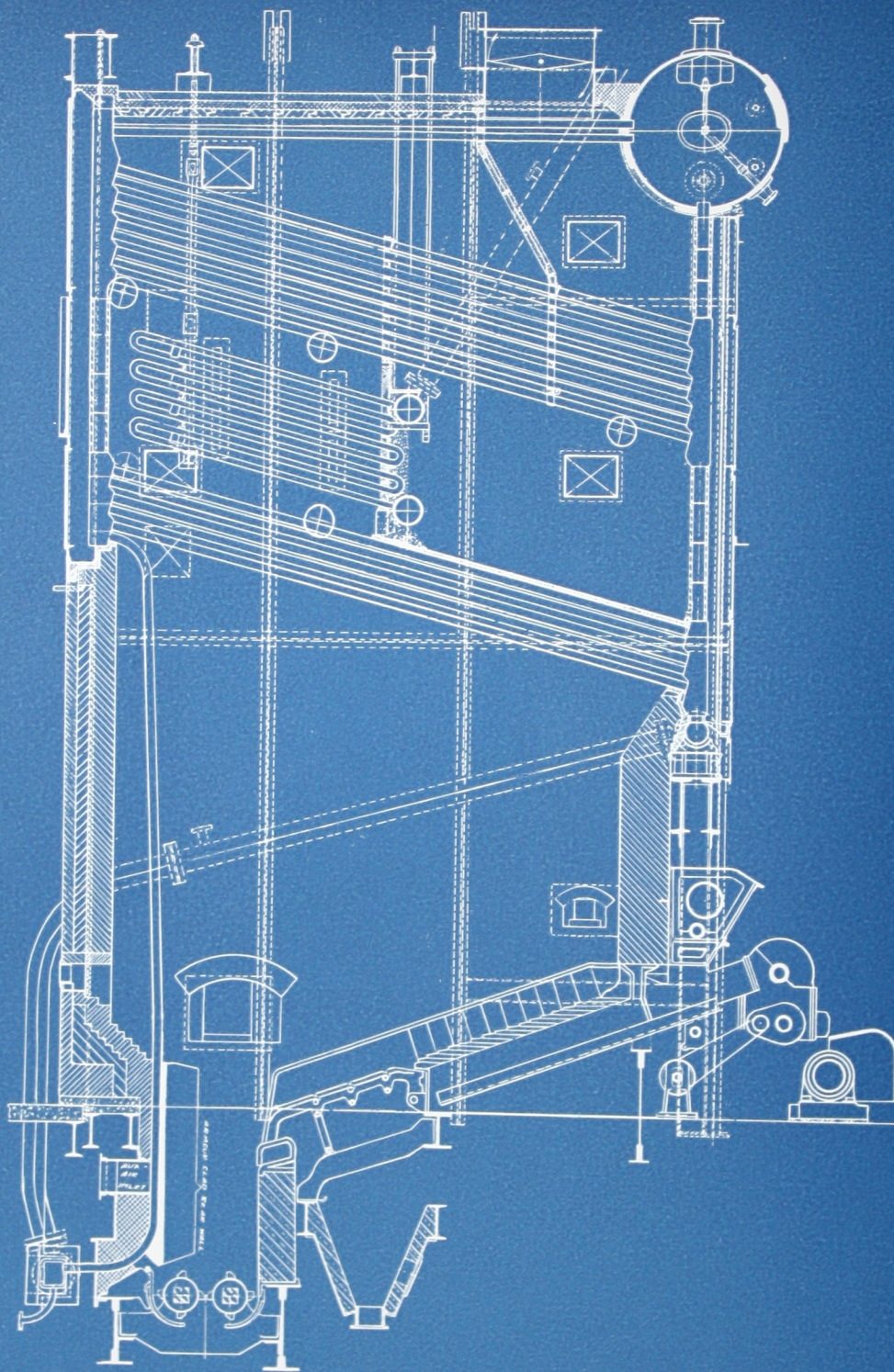


SECTIONAL ELEVATION OF THE 2290 H.P. SPRINGFIELD BOILERS AND WATER WALLS AS ILLUSTRATED ON
 OPPOSITE PAGE, INSTALLED AT THE KEARNY STATION OF THE PUBLIC SERVICE ELECTRIC
 & GAS COMPANY, KEARNY, NEW JERSEY
 PUBLIC SERVICE PRODUCTION CO., ENGINEERS AND CONSTRUCTORS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



ONE OF FOUR SPRINGFIELD UNITS INSTALLED IN THE DEKALB, ILLINOIS PLANT OF THE CENTRAL ILLINOIS LIGHT CO. THIS PICTURE SHOWS WATER-COOLED REAR WALL WITH METAL BLOCKS

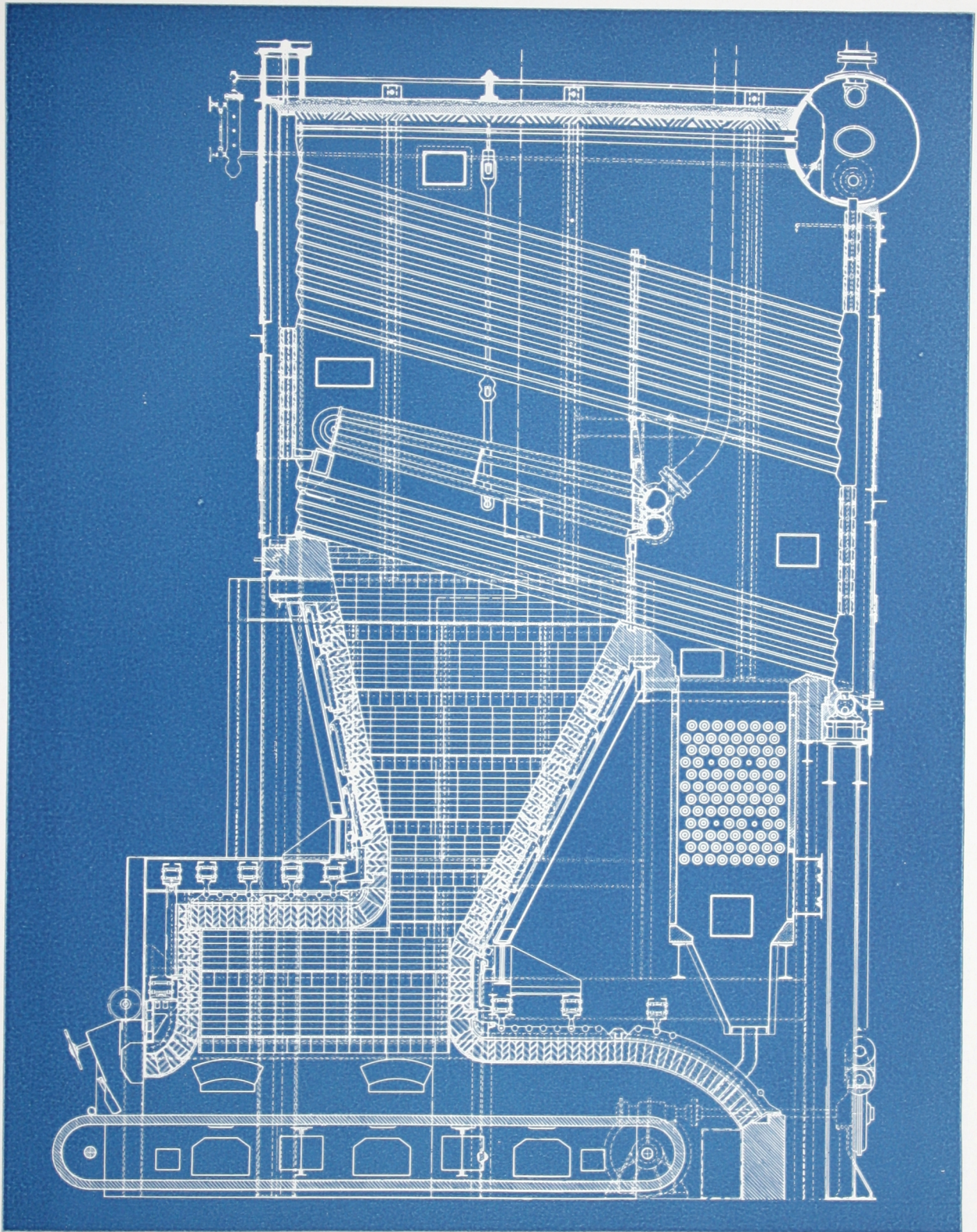
COMMONWEALTH & SOUTHERN CORPORATION, ENGINEERS & CONSTRUCTORS

THIS COMPANY HAS PURCHASED SPRINGFIELD BOILERS totaling 21,406 boiler horse power for their various properties, representing EIGHTEEN REPEAT ORDERS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



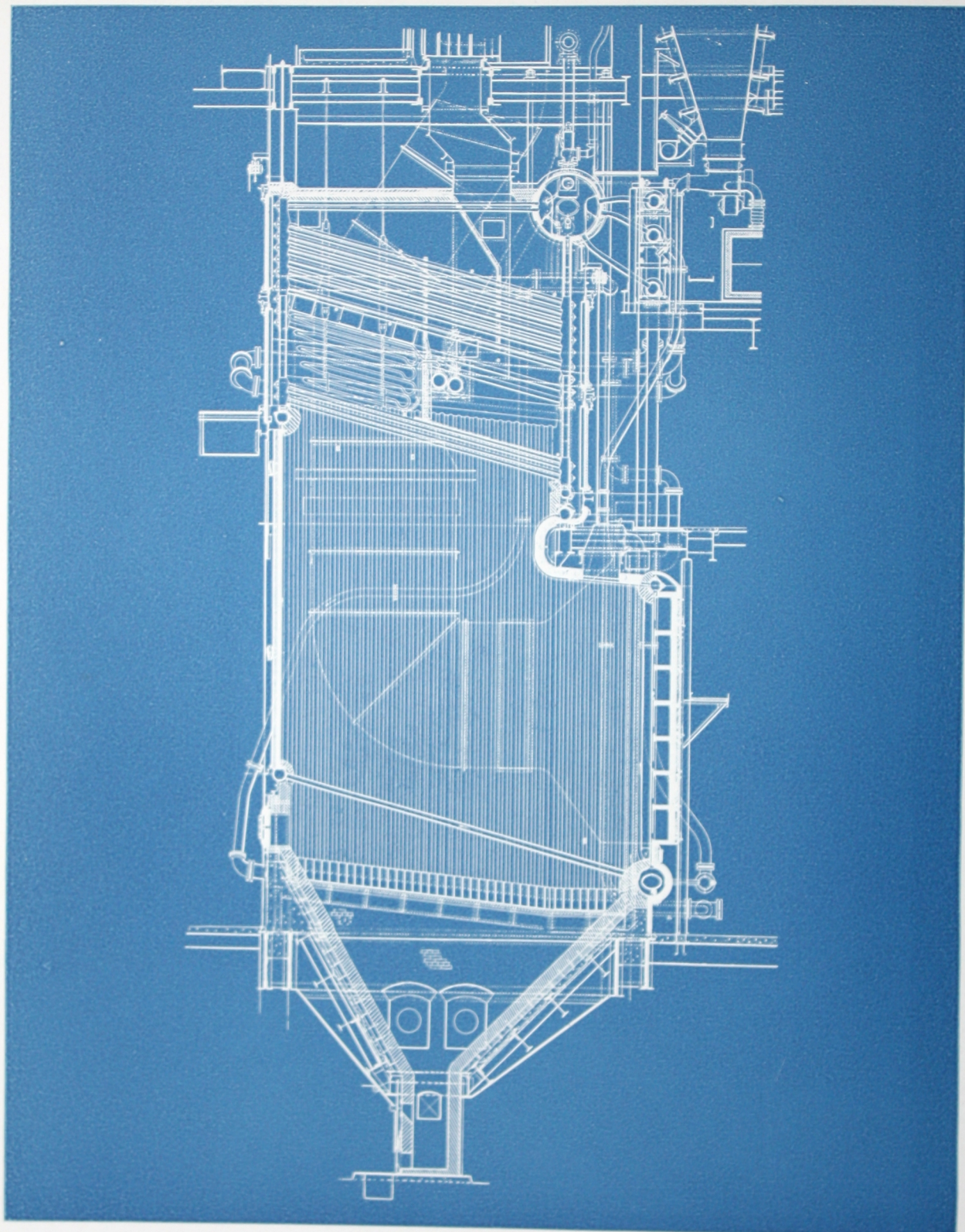
ONE OF THE FIVE 916 H.P. SPRINGFIELD BOILERS INSTALLED FOR THE JERSEY CENTRAL POWER & LIGHT
COMPANY, WHIPPANY, NEW JERSEY

GENERAL ENGINEERING & MANAGEMENT CORPORATION, ENGINEERS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

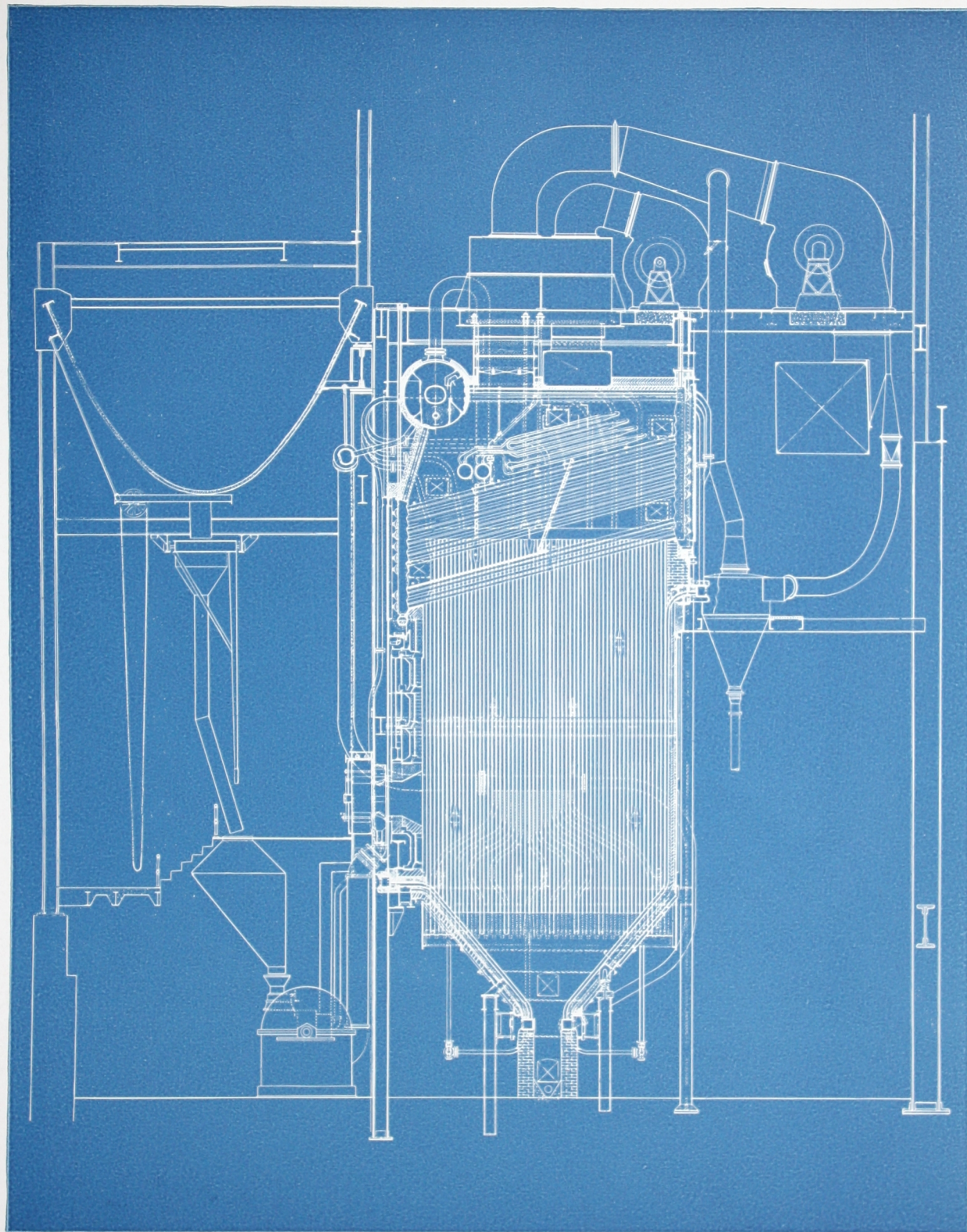


ONE OF SIX 1550 H.P. SPRINGFIELD BOILERS AT THE EAST RIVER STATION OF THE NEW YORK EDISON
COMPANY, NEW YORK CITY
THOMAS E. MURRAY, INC., ENGINEERS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



SECTIONAL VIEW OF SPRINGFIELD BOILER AND WATER WALL UNIT INSTALLED FOR OHIO STATE UNIVERSITY,
COLUMBUS, OHIO

Designed to generate 125,000 lbs. steam per hour

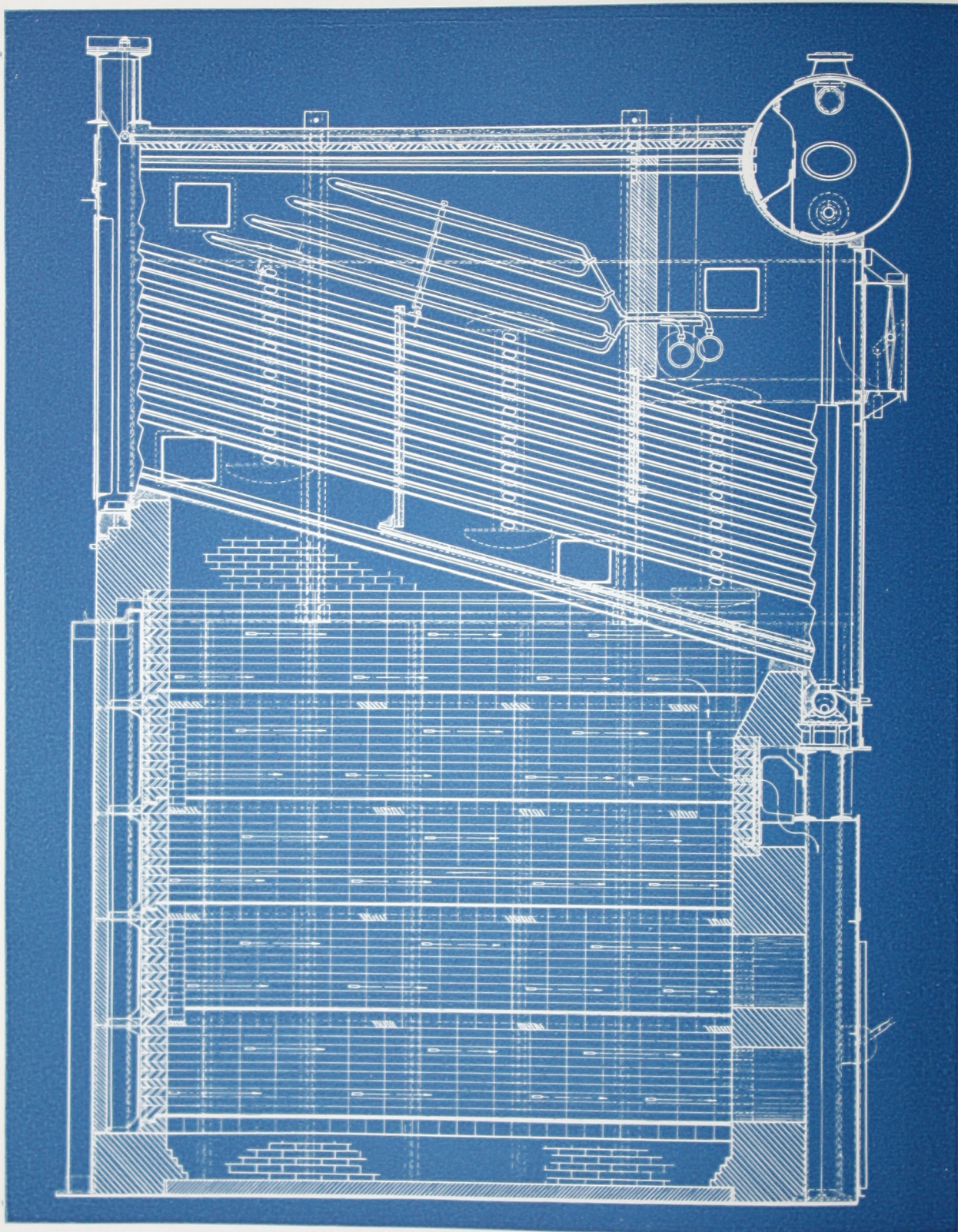
Our contract also included the pulverizing and burning equipment, superheater, air heater, fans, soot blowers, settings and other auxiliaries as selected by purchaser.

MR. GLENN E. HANEY, ENGINEER IN CHARGE OF POWER PLANT

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

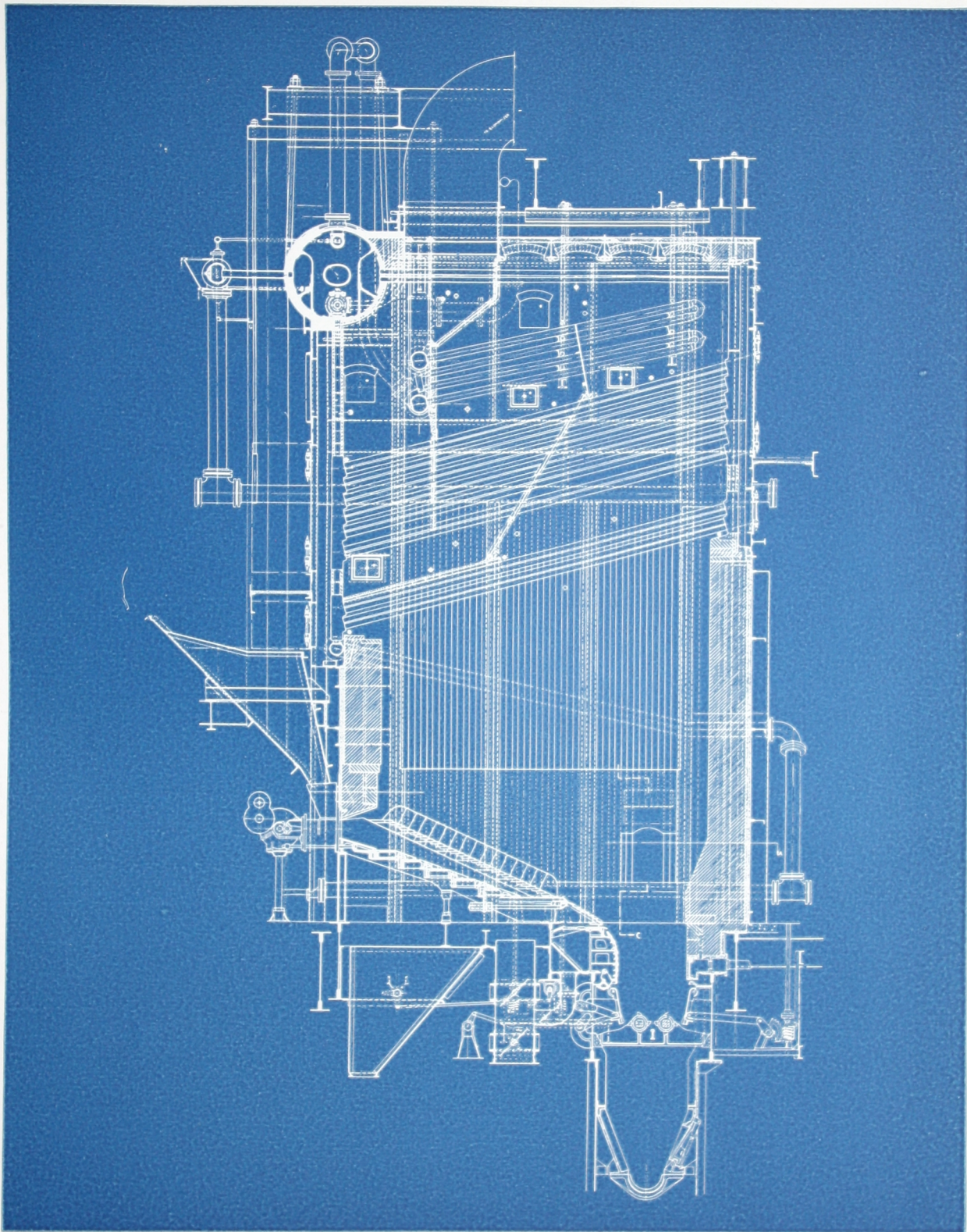


ONE OF THE 763 H.P. SPRINGFIELD BOILERS WITH AIR-COOLED WALLS INSTALLED FOR THE MONTANA-DAKOTA
POWER COMPANY AT GLENDIVE AND MILES CITY, MONTANA
C. M. GARLAND AND COMPANY, ENGINEERS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



ONE OF THE TWENTY-FOUR SPRINGFIELD BOILERS INSTALLED IN HELL GATE STATION, UNITED ELECTRIC
LIGHT & POWER CO., NEW YORK CITY

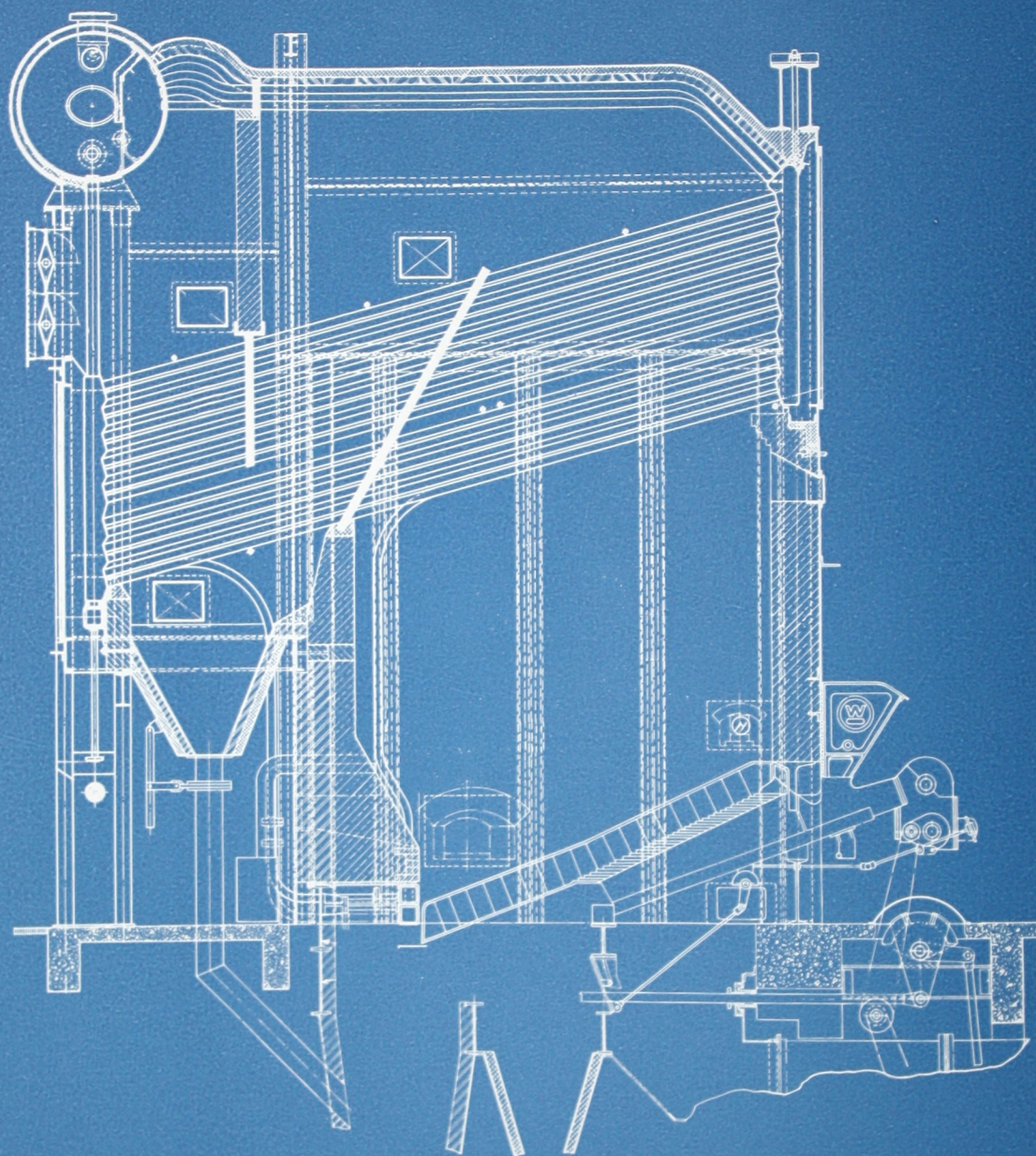
The first successful WATER-WALL FURNACE installation in the United States, designed and installed in 1923.

THOMAS E. MURRAY, INC., ENGINEERS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



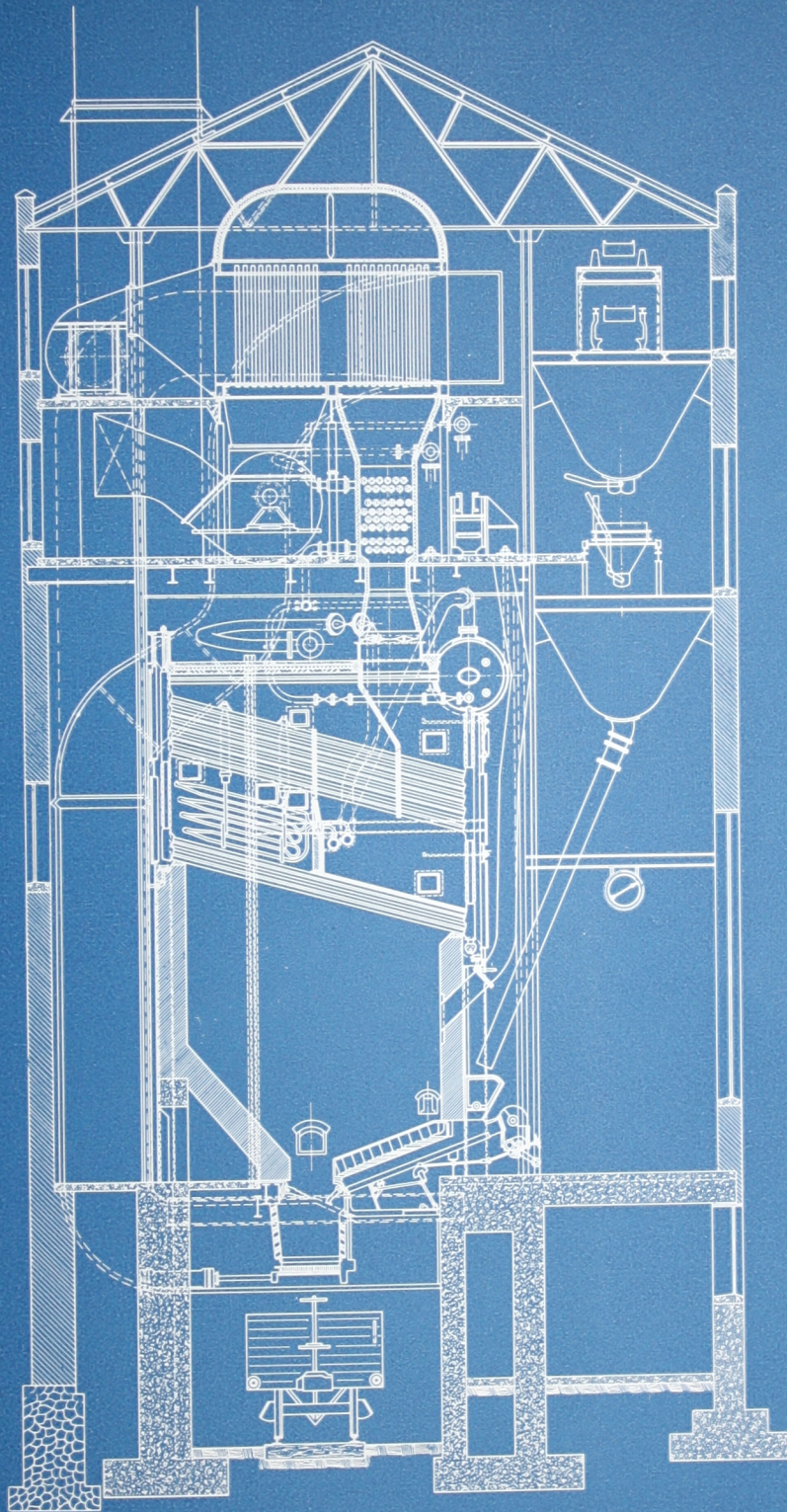
SIDE ELEVATION OF ONE OF THE TWO 1070 H.P. SPRINGFIELD UNITS INSTALLED IN BELLEFIELD BOILER PLANT,
TO SERVE CARNEGIE LIBRARY & INSTITUTE, CATHEDRAL OF LEARNING, UNIVERSITY
OF PITTSBURGH, AND MELLON INSTITUTE, PITTSBURGH, PA.

RUST ENGINEERING CO., ENGINEERS & CONSTRUCTORS

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

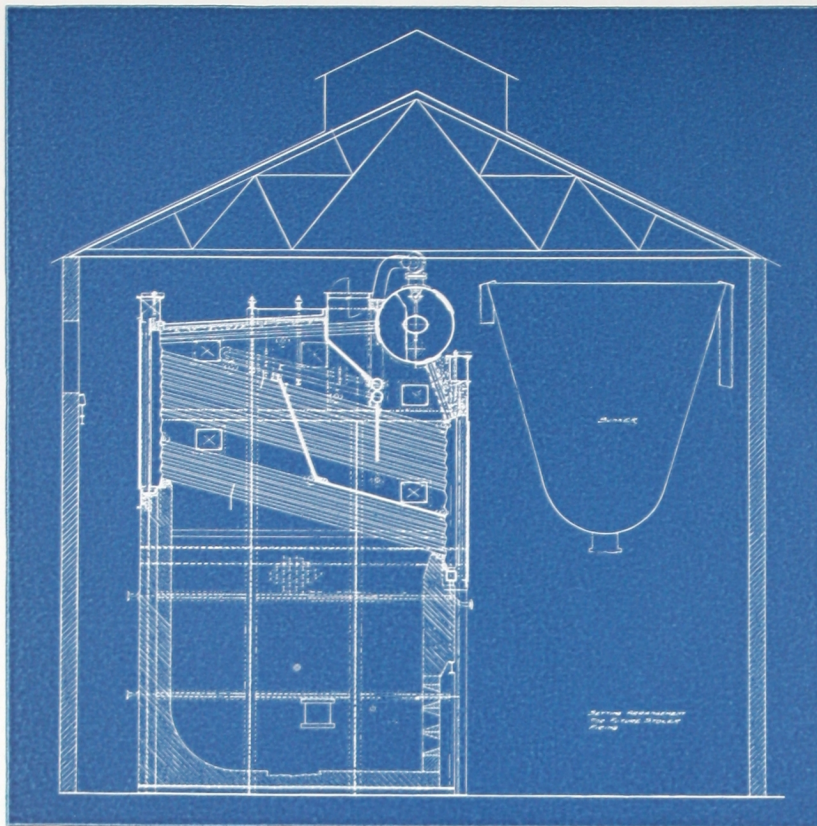


ONE OF FOUR 819 H.P. SPRINGFIELD BOILERS INSTALLED FOR THE CONSOLIDATED WATER
POWER & PAPER COMPANY, WISCONSIN RAPIDS, WISCONSIN, ARRANGED FOR THE BURNING
OF COAL AND WOOD WASTE

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



OWENS-ILLINOIS GLASS
CO.,
ALTON, ILL.

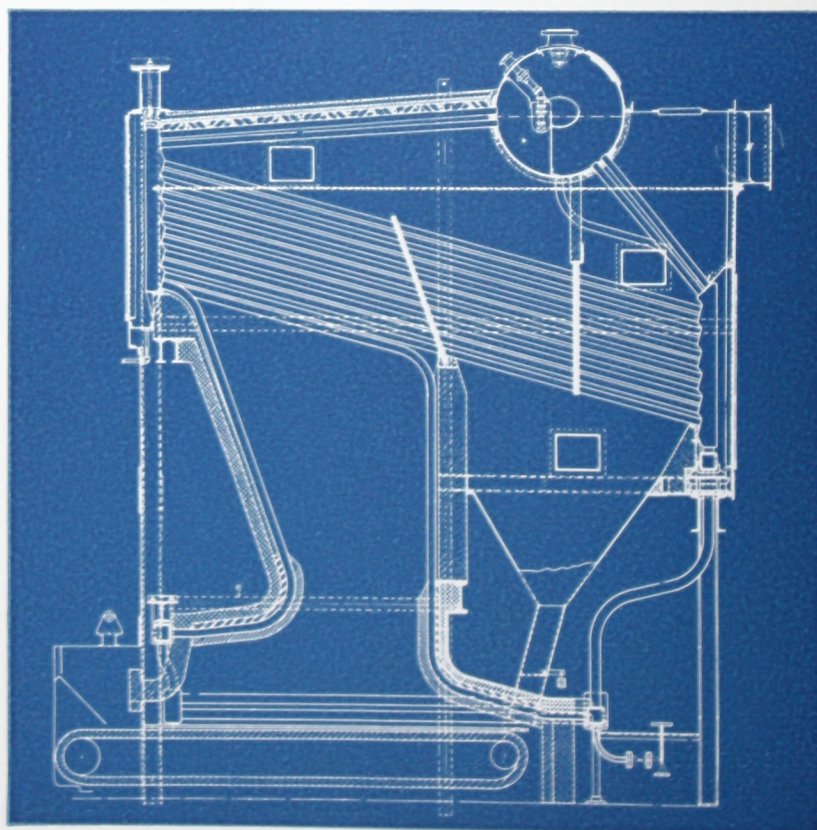
ONE of three SPRINGFIELD
UNITS installed. Setting ar-
ranged for either gas or sto-
ker firing.

ARTHUR L. NELSON,
ENGINEER.

This Company also purchased
SPRINGFIELD BOILERS for two
of their subsidiary plants.



ONE of three 600 H.P.
SPRINGFIELD UNITS equipped
with WATER-COOLED FRONT
ARCH, WATER-COOLED
BRIDGEWALL AND WATER-
COOLED CLINKER CHILL, de-
signed for a large distillery in
the Middlewest.



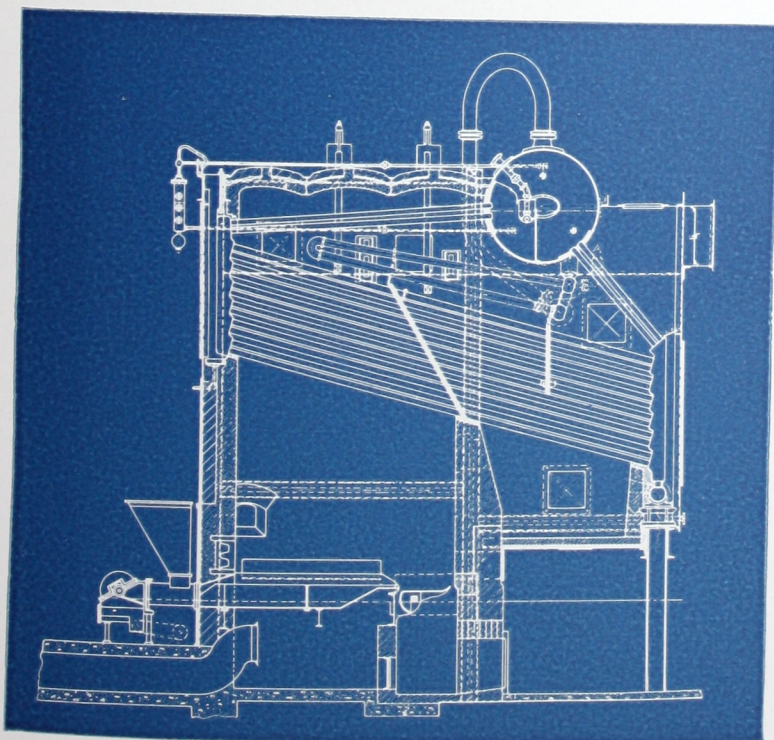
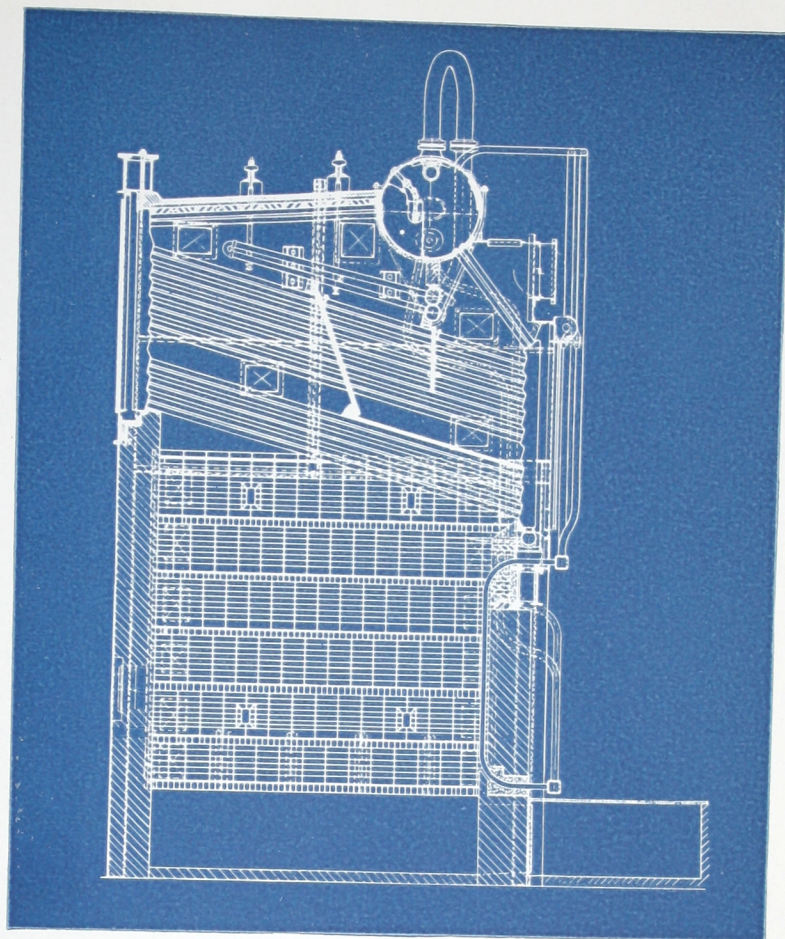
SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

SIDE elevation of 700 H.P.
 SPRINGFIELD UNIT with
 SPRINGFIELD WATER-COOLED
 REAR WALL, installed for
 THE MUNSINGWEAR COR-
 PORATION, Minneapolis, Minn.

E. GUSLANDER,
 CHIEF ENGINEER.



WESTCHESTER
 LIGHTING CO.,
 PELHAM, N. Y.

ONE of two 323 H.P.
 SPRINGFIELD BOILERS install-
 ed in the above plant.

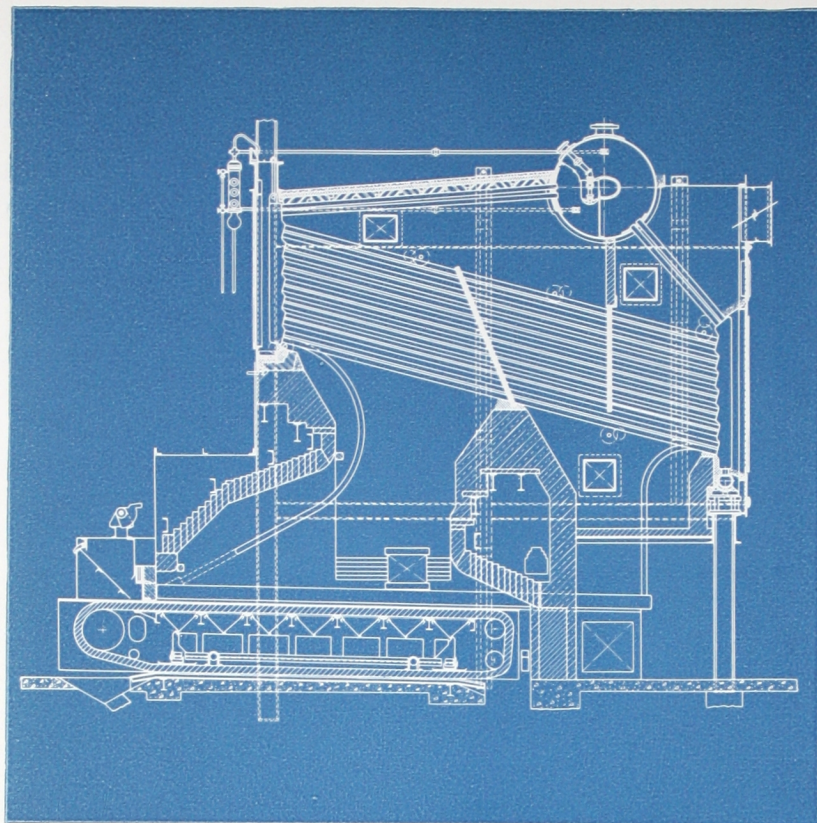
This Company and its subsid-
 iaries have installed FIFTEEN
 SPRINGFIELD BOILERS in their
 various properties represent-
 ing NINE repeat orders.



SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



CATERPILLAR TRACTOR
COMPANY,
PEORIA, ILLINOIS.

ONE of FOUR SPRINGFIELD
UNITS installed in the above
plant.

THE AUSTIN COMPANY,
ENGINEERS.

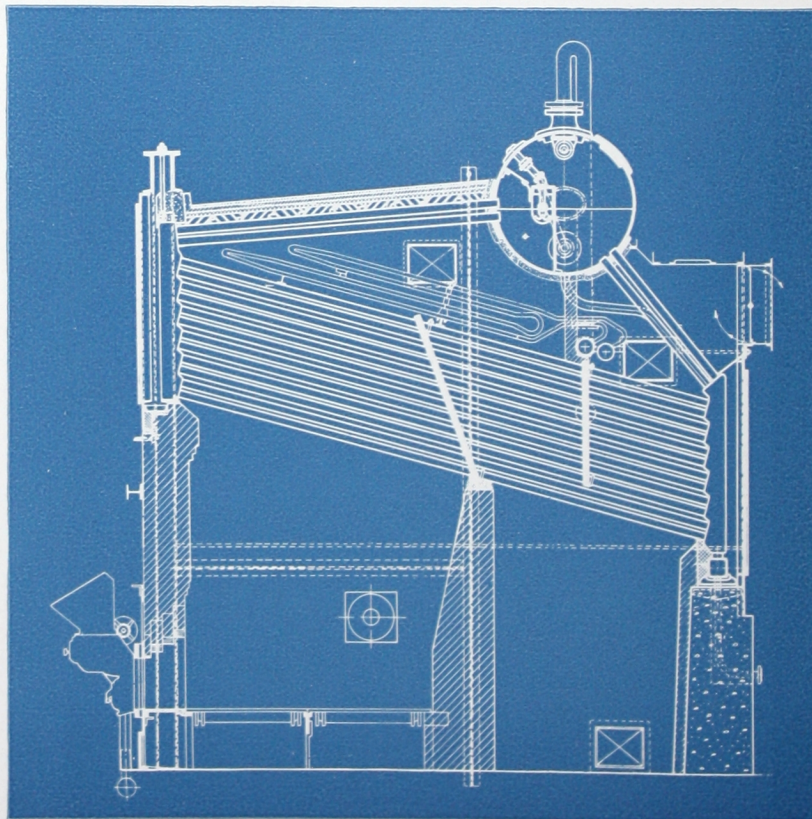


DEERE & COMPANY,
MOLINE, ILLINOIS.

ONE of the SPRINGFIELD
UNITS installed for the above
company.

E. WINHOLT,
CHIEF ENGINEER.

This company has purchased
SPRINGFIELD UNITS for their
various plants EIGHT TIMES,
totaling 5327 H.P.



SPRINGFIELD BOILER CO.,

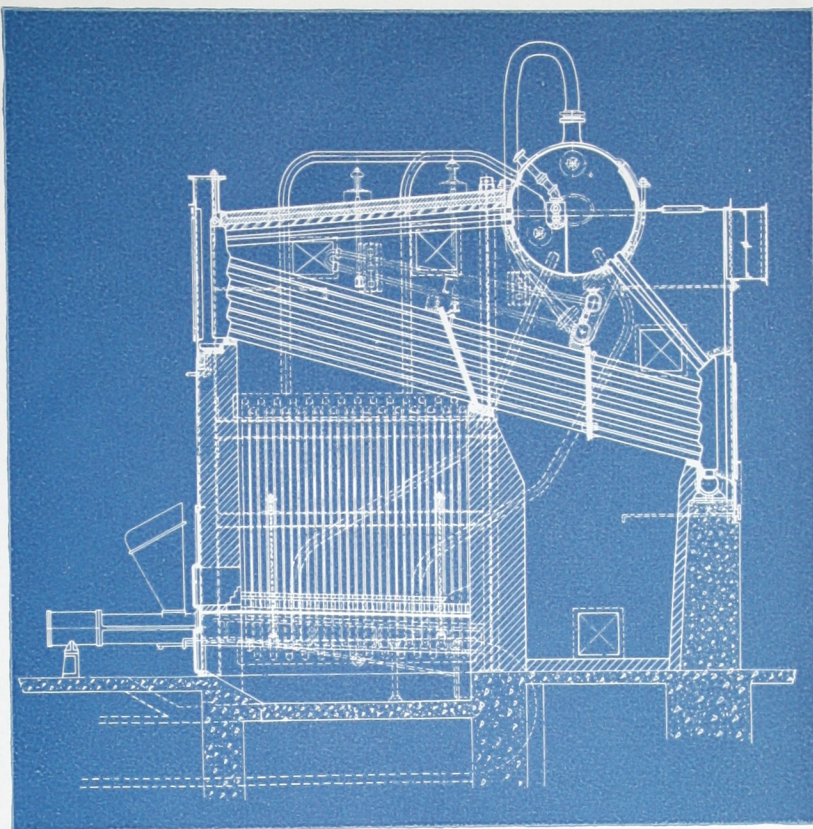


SPRINGFIELD, ILLINOIS, U. S. A.

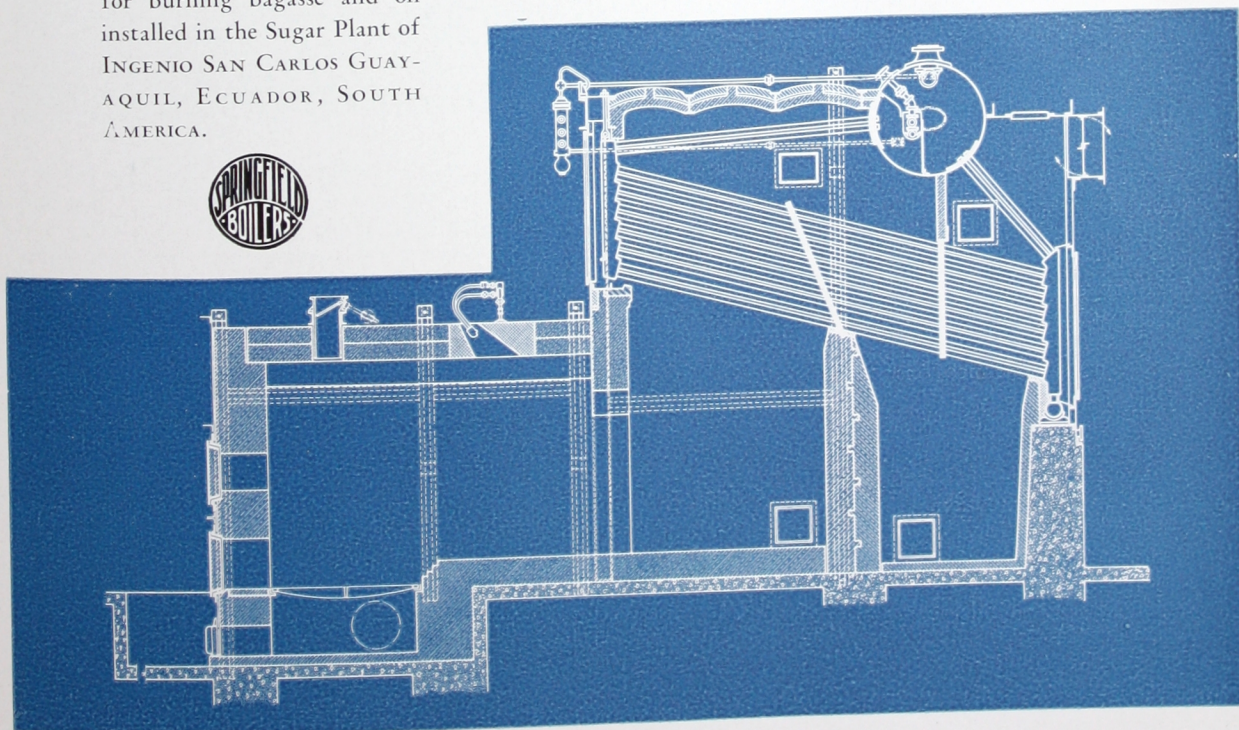
CITY OF NEW PRAGUE,
MUNICIPAL POWER
PLANT
NEW PRAGUE, MINN.

TWO SPRINGFIELD UNITS,
BOILERS AND WATER WALLS
installed.

JOSEPH T. RYNDA,
ENGINEER.



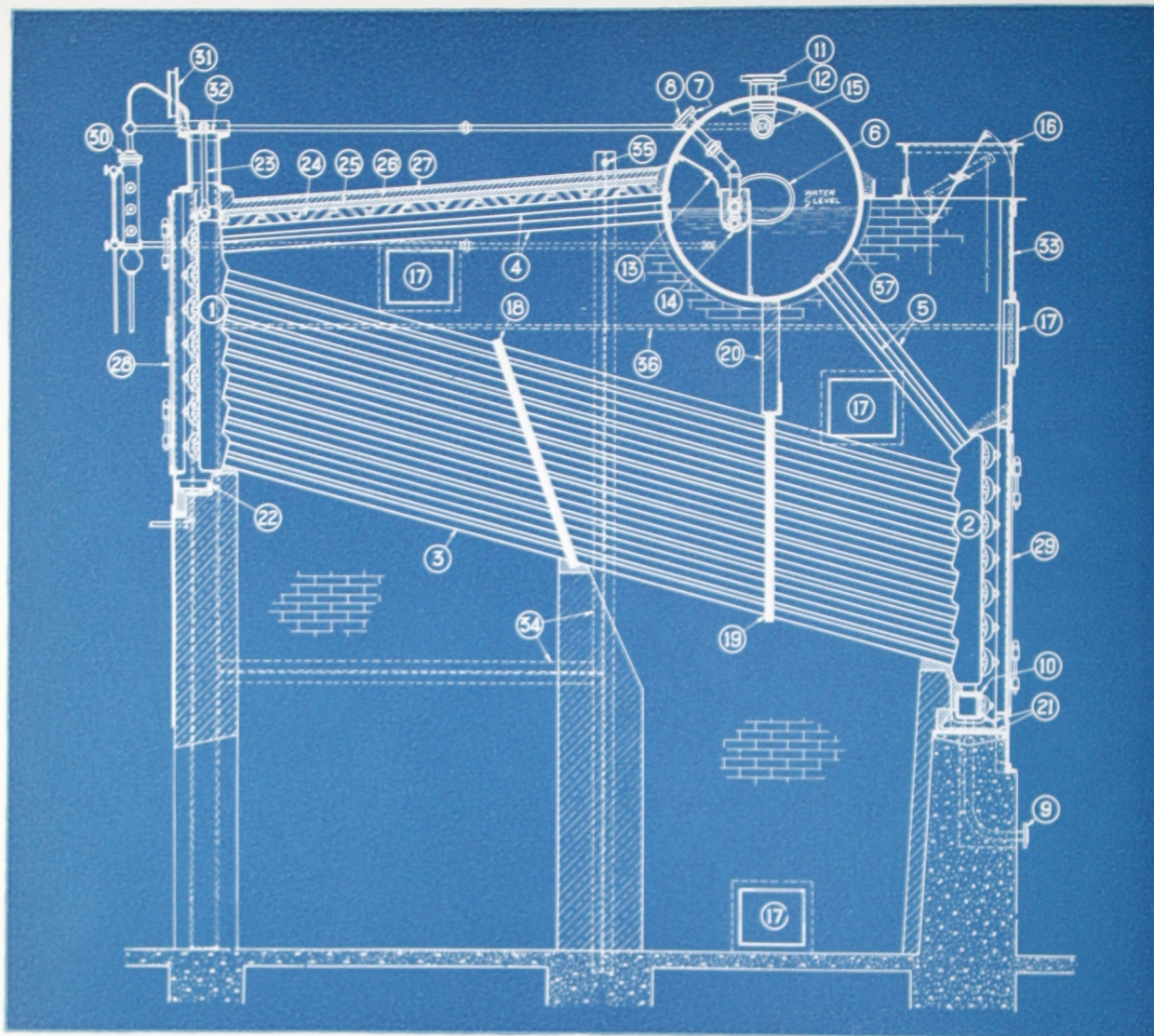
ONE OF FOUR 500 H.P.
SPRINGFIELD UNITS arranged
for burning bagasse and oil
installed in the Sugar Plant of
INGENIO SAN CARLOS GUAY-
AQUIL, ECUADOR, SOUTH
AMERICA.



SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.



Salient Features of the Standard Springfield Boiler

- | | |
|----------------------------------|---|
| 1. Front headers | 20. Hanging bridge wall |
| 2. Rear headers | 21. Mud drum saddles, plates and expansion rollers |
| 3. Main bank of tubes | 22. Drip channel |
| 4. Delivery tubes | 23. Hanger rod |
| 5. Supply tubes | 24. Ship lap tile for roof |
| 6. Manhole | 25. Insulation for roof |
| 7. Feed pan drain connections | 26. Red brick for roof |
| 8. Feed pipe connection | 27. Hard finish for roof |
| 9. Mud drum blow-off connection | 28. Front doors covering headers |
| 10. Mud drum | 29. Rear doors covering headers |
| 11. Main steam outlet connection | 30. Water column |
| 12. Safety valve connection | 31. Steam gauge |
| 13. Baffle plate | 32. Structural frame from which boiler is suspended |
| 14. Feed pan | 33. Rear steel frame |
| 15. Dry pipe | 34. Buckstays |
| 16. Smoke outlet with damper | 35. Buckstay thru rod |
| 17. Clean out doors | 36. Rear frame thru rod |
| 18. Front baffle (inclined) | 37. Insulation between brickwall and steam drum. |
| 19. Rear baffle (vertical) | |

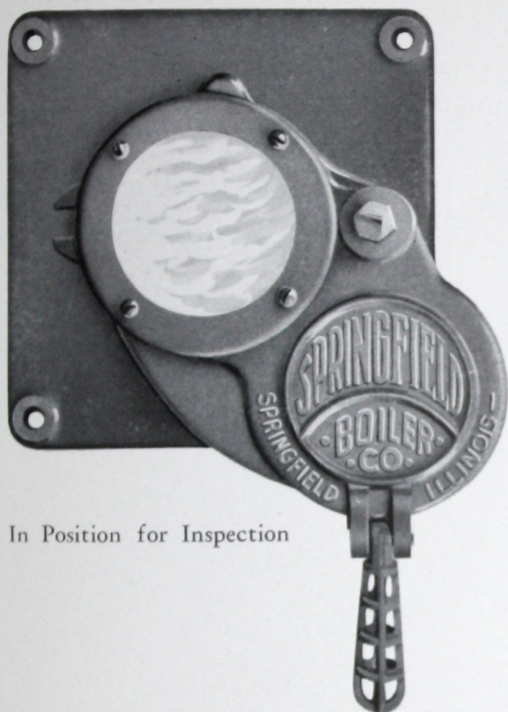
SPRINGFIELD BOILER CO.,



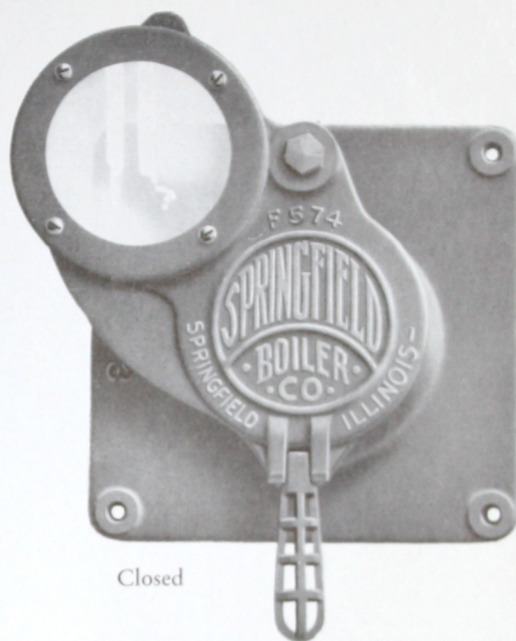
SPRINGFIELD, ILLINOIS, U. S. A.

SPRINGFIELD PEEP-HOLE DOOR

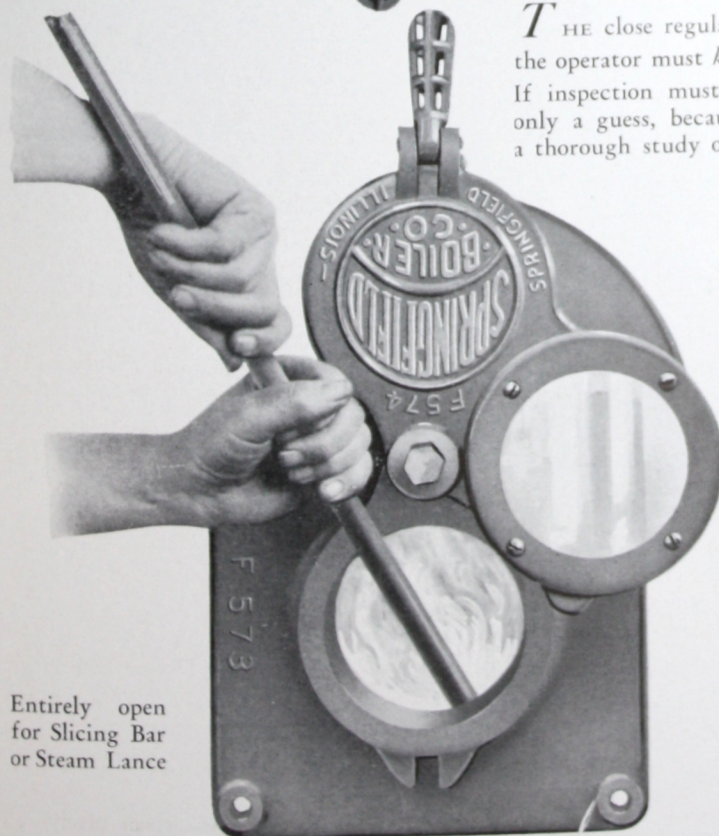
SEE WITH SAFETY



In Position for Inspection



Closed



Entirely open
for Slicing Bar
or Steam Lance

THE close regulation of the fire in modern furnaces means that the operator must *know*—at all times—what's going on inside.

If inspection must be made through a large door, his opinion is only a guess, because the intense heat and brilliant glare prevent a thorough study of furnace linings, fuel bed or combustion—and

the admission of excess air chills the boiler or still and disturbs furnace conditions.

The Springfield Peep-Hole Door not only permits thorough inspection in comfort, but it demonstrates an actual money saving. It is inexpensive to buy and simple to install. It may be attached to the fire or inspection door, or placed on the brick-work without necessitating serious changes in refractory lining.

It will save fuel by enabling the operator to keep the furnace in proper condition *all the time*.

It saves repair bills, because any defects in refractory or any other unfavorable conditions may be detected and corrected before damage is done.

The opening allows the insertion of slice bar or steam lance without opening the large doors and chilling the furnace.

It is just as necessary to watch furnace conditions in the interests of economy as it is to watch the water glass in the interests of safety. You will *know* what's going on if you use a Springfield Peep-Hole Door.

Weight—packed for shipment—about 50 lbs.

SPRINGFIELD BOILER CO.,



SPRINGFIELD, ILLINOIS, U. S. A.

Suggested Rules for Care and Operation of Power Boilers

1. **PREPARING BOILERS FOR SERVICE.** Before filling a boiler for service make certain that all scale, oil and foreign matter have been removed. Gaskets should be new or in good condition. Use suitable graphite paste to prevent the gaskets from sticking and to secure tightness.

2. **FILLING THE BOILER.** Do not refill a boiler unless it is cool. Use hot water if available. Vent the boiler to permit the air to escape, then fill to the normal working level.

3. **GETTING UP STEAM.** Ventilate the furnace thoroughly and start the fire with damper and draft doors open. Do not use highly inflammable oils or gasoline with solid fuel. Start the fire early so that steam pressure may be raised without forcing the boiler.

4. **GAS, OIL, OR POWDERED COAL FUEL.** Do not turn on the fuel supply at any time until the furnace has been thoroughly ventilated and a lighted torch or other means of ignition has been properly placed to ignite the fuel instantly.

5. **CUTTING-IN BOILERS.** In placing a boiler on the line with others which are already in service, keep its stop valve closed until the pressure within the boiler has become exactly equal to that in the steam main. See that the steam piping is thoroughly drained before the valve is opened. Open the valve very slightly; then, if there is no unusual jar or disturbance, complete the opening slowly. Close the valve at once if there is the slightest evidence of an unusual jar or disturbance about the boiler.

6. **WATER LEVEL.** Whenever going on duty, immediately determine the level of the water in the boiler. Make sure that the gage glass, gage cocks and all the connections to the boiler are in working order. Do not rely upon the gage glass altogether but use the gage cocks several times daily to check the water level. If the boiler is equipped with two sets of water gages the water levels should correspond closely. If an unusual difference is noted, determine and remove the cause even if necessary to cool the boiler.

7. **LOW WATER.** In case of low water, immediately cover the fuel bed with ash, fresh fine coal, or earth. Close the ash-pit doors and leave the fire door open. If gas, oil or powdered coal is used as fuel, shut off the supply to the burner. Do not turn on the feed water. Do not open the safety valve or tamper with it in any way. Cool off and then ascertain level of water in the boiler.

8. **SAFETY VALVE.** Each safety valve should operate automatically with sufficient frequency to make certain that it blows at a pressure not in excess of that stipulated in the Insurance Company's policy, or the legal certificate to operate. Each safety valve should have a try lever with which it may be opened by hand. If the actual operating pressure as shown by the steam gage exceeds the pressure at which the safety valve is supposed to blow, inform your employer immediately so that the Insurance Company or the City or State Boiler Inspection Department can be notified and the correctness of the pressure gage determined.

9. **THE BLOW OFF PIPE.** If the feed water is of poor quality and the boiler is not provided with a continuous blow down, the blow off valve should be opened at the beginning of each shift to remove the accumulated sediment.

If a valve and a cock are used in the blow off line, open the cock and then open the valve slowly. After blowing down one gage of water, the valve should be closed slowly before the cock is closed to avoid water hammer action.

10. **FEED VALVE.** The boiler feed line should have two stop valves with a check valve between located near its connection to the boiler. The feed water should enter each stop valve under the disc so the pump pressure will open the valve if the disc should become loose from the stem.

11. **FOAMING.** In case of foaming reduce the furnace temperature and decrease the load upon the boiler until the true water level can be determined. Maintain a normal level by alternately feeding fresh water and operating the blow-off valve. Use the surface blow down freely if boiler is provided with one. Cool, empty and clean the boiler as soon as it can be done and investigate the condition of the feed water being used.

12. **PRIMING.** When wet steam affects the operation of the prime mover, determine if the water level is unusually high or if the load upon the boiler is above normal. A reduction to standard water and load condition should eliminate the priming unless the water baffles or steam baffles are in need of attention.

13. **BANKING THE FIRE.** Clean the fire before banking. Push the live coal back against the bridge wall and cover with fresh coal. Clean the balance of the grate and close the ash-pit and fire doors. Adjust the damper but do not close it tightly. The damper should be arranged so it cannot be completely closed. Before breaking the banked fire, be sure the damper is wide open and that the furnace and breeching leading to the stack have been ventilated.

14. **COOLING THE BOILER.** Close the steam pipe stop valve if the boiler is one of a battery. Increase the water level until the gage glass is filled. Dump the fire and clean or flood the ash-pit. Keep fire doors closed. Have damper and ash doors open to allow air to circulate through the furnace. Boiler should be cooled slowly preventing any great quantities of cold air from impinging directly on any tube seats or riveted joints. One gage of water at a time may be blown from the boiler and replaced with fresh water until the furnace lining near the fire door is comfortable to the hand and the pressure has been reduced to ten pounds or less. The boiler may then be emptied and the manhole and handhole plates removed.

15. **AVOID SCALDING MEN.** Attach a sign, "DO NOT OPEN", to each valve when boiler is ready for cleaning and repair. Do not remove the sign or open a valve until the boiler is closed up for filling. It is well to lock the stop valve and blow off valve in the closed position on each boiler of a battery in which a man is working, if other boilers in the same battery are under pressure. Padlocks and chains may be used for this purpose.

16. **CLEANING THE BOILER.** The frequency of boiler cleaning depends entirely upon the quality of the feed water. It may be necessary to wash the boiler every week. The use of a large amount of scale solvent or a change from raw water to the use of condensate, rain water, or other soft water, or placing a boiler in service after a long period of idleness, is likely to be followed by the loosening of a considerable amount of scale; so the boiler should be cleaned thoroughly within a few days after the change in feed water has taken place.

17. **OIL IN BOILERS.** Cylinder oil or other high test oil acts as a non-conductor of heat and if not kept out of the boiler is likely to cause overheating of the furnace plate, as well as leakage at the seams and tube ends. Oily deposits may be removed by scrubbing and scraping. Kerosene if applied locally in sufficient quantity will loosen or dissolve the coating. An open light must not be used in and around the boiler being treated with kerosene. Soda ash, if used in reasonable amounts, will aid in the elimination of the oil.

18. **SOOT BLOWERS.** The outside of heating surface should be kept free from soot and dust accumulations by use of the soot blower equipment furnished and at such intervals as the operating conditions may require.

19. **CLEANING COMBUSTION CHAMBER.** Do not enter a dust filled combustion chamber without first making sure the accumulation is cool underneath. If a hose is used to cool the accumulation, introduce the nozzle with extreme caution as there may be a dangerous explosion.

20. **FUSIBLE PLUGS.** The high temperature fusible plug, if used, should be filled with pure Banca tin and stamped as Mass. Std. or A. S. M. E. Std. by its maker. The fusible plug should be cleaned at each boiler washing and should be replaced with a new plug annually.

21. **LEAKS.** Establish a routine of opening each door about the setting and looking carefully for leaks. If leaks are discovered at any time they should be located and repaired; BUT COOL THE BOILERS FIRST.

22. **REPAIRS UNDER PRESSURE.** No repairs of any kind should be made, either to boilers or to piping, while the part upon which the work is to be done is under pressure. This applies to repairs of every kind whatsoever.

23. **LAYING UP BOILERS.** If a boiler is to be out of service for a month or more, it should be emptied, opened and cleaned internally and externally. Then dry it out by building a small fire of newspapers or other light material in the furnace. Do not let the boiler get too warm to be comfortable to the hand. See that no moisture can collect within or about the boiler. If the boiler is to be idle for a considerable length of time, paint all external parts.

If desired, the manhole and handhole plates may be placed in position without tightening them. Remove and store the steam pressure gage and its siphon pipe.

Clean the setting inside and outside. The idle boiler which remains filled with water and covered with soot deteriorates rapidly.

24. **CORROSION.** Do not allow moisture to come in contact with the outside of the boiler at any time from any source. Keep the mud drums and nipples and the ends of the tubes in water tube boilers free from soot. All parts of a boiler below the water line should be made accessible for external examination annually.

25. **PREPARATION OF BOILER FOR INSPECTION.** After the boiler has been cooled remove the ash from the grate and combustion chamber. Empty, open and clean the boiler internally and externally prior to the inspection. The thorough examination of the boiler is necessary to its safety and gives protection to everyone connected with its operation.

26. **LOCAL LAWS AND ORDINANCES.** Inform yourself respecting any local laws relating to the duties of engineer and fireman or to the safety requirements of your work. The careless boiler operator is a source of danger to others as well as to himself.

PREPARED BY THE AMERICAN BOILER MANUFACTURERS ASSOCIATION

